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10 CFR 50.90

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U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
ATTN: Document Control Desk

Limerick Generating Station, Units 1 and 2
Renewed Facility Operating License Nos. NPF-39 and NPF-85
NRC Docket Nos. 50-352 and 50-353

Subject: License Amendment Request to Reinstate and Apply Risk-Informed Completion Time (RICT) Applications

References:

1. U.S. Nuclear Regulatory Commission (NRC) letter to Constellation Energy Generation, LLC (Constellation), "Limerick Generating Station, Units 1 and 2 – Issuance of Amendment Nos. 240 and 203 to Implement TSTF-505, Revision 2, 'Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4B' (EPID L-2018-LLA-0567)," dated February 28, 2020 (NRC Agencywide Documents Access and Management System (ADAMS) Accession No ML20034F637)

2. Constellation letter to the NRC, "License Amendment Request to Revise the Licensing and Design Basis to Incorporate the Replacement of Existing Safety-Related Analog Control Systems with a Single Digital Plant Protection System (PPS)," dated September 26, 2022 (ADAMS Accession No. ML22269A569)

3. Constellation letter to the NRC, "Resubmittal of License Amendment Request to Revise the Licensing and Design Basis to Incorporate the Replacement of Existing Safety-Related Analog Control Systems with a Single Digital Plant Protection System (PPS) –To Address Proprietary Issues with DOE INL HFE Reports," dated September 12, 2023 (ADAMS Accession No. ML23255A095)

4. NRC letter to Constellation, "Limerick Generating Station, Units 1 and 2 - Issuance of Amendment Nos. 268 and 230 To Revise the Licensing and Design Basis Related to the Replacement of Safety-Related Analog Control Systems with a Single Digital Plant Protection System (EPID L-2022-LLA-0140)," dated January 2, 2026 (ADAMS Accession No. ML25325A355); and "Limerick Generating Station, Units 1 and 2 - Correction of Amendment Nos. 268 and 230 to Revise the Licensing and Design Basis Related to the

Replacement of Safety-Related Analog Control Systems with a Single Digital Plant Protection System (EPID L-2022-LLA-0140)," dated February 12, 2026 (ADAMS Accession No. ML26034C213).

5. TSTF Comments on Draft Safety Evaluation for Traveler TSTF-505, "Provide Risk-Informed Extended Completion Times" and Submittal of TSTF-505, Revision 2, dated November 21, 2018 (ADAMS Accession No. ML18183A493).

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," Constellation Energy Generation, LLC (Constellation) is requesting approval for proposed changes to Appendix A, Technical Specifications (TS), of Renewed FOL Nos. NPF-39 and NPF-85 for LGS, Units 1 and 2, respectively.

In Reference 1, the U.S. Nuclear Regulatory Commission (NRC) issued License Amendments 240 and 203 to Limerick Generating Station (LGS), Units 1 and 2, respectively. These amendments approved the use of Risk Informed Completion Times (RICTs) for LGS Units 1 and 2 in accordance with Technical Specification Task Force Traveler (TSTF) -505, Revision 2, "Provide Risk-Informed Extended Completion Times - RITSTF Initiative 4b," Reference 5.

In Reference 2, Constellation submitted a License Amendment Request (LAR) to facilitate replacement of the LGS Units 1 and 2 existing safety-related analog control systems with a single digital Plant Protection System (PPS) (i.e., the Digital Modernization Project - DMP). In Reference 3, Constellation submitted a LAR supplement that replaced in its entirety the original LAR (hereafter referred to as the "DMP LAR") in order to address issues associated with proprietary/non-proprietary information previously submitted.

Due to the complexity of the equipment configuration being installed and the associated TS Completion Times (CTs), select RICTs were revised in the DMP LAR by restoring the associated CTs to their deterministic values. In Reference 4, the NRC issued License Amendments 268 and 230 to the LGS Units 1 and 2 FOLs, which approved the DMP LAR.

This proposed amendment reinstates select previously NRC-approved RICT applications for TS requirements revised in the DMP LAR, and applies the existing RICT Program to certain new or restructured TS requirements associated with the Plant Protection System (PPS), where those requirements reflect existing safety functions within the scope of the approved program. This request does not remove or revise the RICT Program methodology.

This request is subdivided as follows:

- Attachment 1 provides a description and assessment of the proposed changes, the requested confirmation of applicability, and plant-specific verifications
- Attachment 2 provides the existing TS pages marked up to show the proposed changes
- Attachment 3 provides a markup for the proposed changes to the TS Bases and is provided for information only
- Attachment 4 provides Cross Reference of TSTF-505 and LGS TS

- Attachment 5 provides information supporting the redundancy and diversity of instrumentation governed by the TS proposed to be included as part of the RICT program in this submittal

- Enclosure 1 provides a list of revised required actions to corresponding PRA Functions
- Enclosure 2 provides information supporting consistency with NRC Regulatory Guide (RG) 1.200, "Revision 3
- Enclosure 5 provides Baseline Core Damage Frequency (CDF) and Large Early Release Frequency (LERF)
- Enclosure 9 provides key assumptions and sources of uncertainty
- Enclosure 12 provides risk management action examples

Enclosure 4 is not provided because the justification for excluding sources of risk is not addressed by the PRA models that were previously established and approved by the NRC (Reference 1) and remains applicable to this license amendment request. The digital PPS modification does not introduce new sources of risk outside the scope of the PRA models or otherwise change the basis for the previously NRC approved treatment of non-modeled sources of risk.

The LGS RICT Program implementation processes, PRA model update process, real-time risk assessment tool attributes, and monitoring program were previously established and approved by the NRC (Reference 1). These programmatic elements remain applicable to the RICT Program following implementation of the digital PPS modification, except as supplemented by the digital PPS-specific information provided in this license amendment request. Accordingly, Enclosures 4, 7, 8, 10, and 11 from the original LGS RICT application are not repeated in this submittal.

These proposed changes have been reviewed and approved by the LGS Plant Operations Review Committee in accordance with the requirements of the Constellation Quality Assurance Program.

The amendment shall be implemented within 180 days following the refueling outage where the approved digital system modification issued January 2, 2026 (ADAMS Accession No. ML25325A355) is installed on the respective LGS Unit.

In accordance with 10 CFR 50.91, "Notice for public comment; State consultation," paragraph (a)(1), the analysis about the issue of no significant hazards consideration using the standards in 10 CFR 50.92 is being provided to the Commission.

This letter contains no regulatory commitments.

If you have any questions regarding this submittal, then please contact Ricardo Lantigua at Ricardo.Lantigua@Constellation.com.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this1st day of July 2026.

Respectfully,

Para, Wendi E
2026.07.01
12:56:22 -04'00'

Wendi Para
Sr. Manager - Licensing
Constellation Energy Generation, LLC

Attachments:

1. Description and Assessment
2. Proposed Technical Specification Changes (Mark-Ups)
3. Proposed Technical Specification Bases Changes - For Information Only
4. Cross-Reference of TSTF-505 and Limerick Generating Station Technical Specifications
5. Information Supporting Instrumentation Redundancy and Diversity

Enclosures:

1. List of Revised Required Actions to Corresponding PRA Functions
2. Information Supporting Consistency with Regulatory Guide 1.200, Revision 3
5. Baseline Core Damage Frequency (CDF) and Large Early Release Frequency (LERF)
9. Key Assumptions and Sources of Uncertainty
12. Risk Management Action Examples

cc: USNRC Region I, Regional Administrator
USNRC Project Manager, LGS
USNRC Senior Resident Inspector, LGS
Director, Bureau of Radiation Protection - Pennsylvania Department of Environmental Protection

ATTACHMENT 1

License Amendment Request

Limerick Generating Station, Units 1 and 2
Docket Nos. 50-352 and 50-353

License Amendment Request to Reinstate and Apply
Risk-Informed Completion Time (RICT) Applications

Description and Assessment

1.0 DESCRIPTION

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," Constellation Energy Generation, LLC (Constellation) is requesting approval for proposed changes to Appendix A, Technical Specifications (TS), of Renewed FOL Nos. NPF-39 and NPF-85 for LGS, Units 1 and 2, respectively.

In Reference 1, the U.S. Nuclear Regulatory Commission (NRC) issued License Amendments 240 and 203 to Limerick Generating Station (LGS), Units 1 and 2, respectively. These amendments approved the use of Risk Informed Completion Times (RICTs) for LGS Units 1 and 2 in accordance with Technical Specification Task Force Traveler (TSTF) -505, Revision 2, "Provide Risk-Informed Extended Completion Times - RITSTF Initiative 4b," Reference 4.

In Reference 2, Constellation submitted a License Amendment Request (LAR) to facilitate replacement of the LGS Units 1 and 2 existing safety-related analog control systems with a single digital Plant Protection System (PPS) (i.e., the Digital Modernization Project - DMP). In Reference 3, Constellation submitted a LAR supplement that replaced in its entirety the original LAR (hereafter referred to as the "DMP LAR") in order to address issues associated with proprietary/non-proprietary information previously submitted.

Specifically, the DMP LAR and the associated plant modification replaces the existing analog control-logic hardware of the Reactor Protection System (RPS) instrumentation, Nuclear Steam Supply Shutoff System (NSSSS) instrumentation, Emergency Core Cooling System (ECCS) instrumentation, Reactor Core Isolation Cooling (RCIC) System instrumentation, and End-of-Cycle Recirculation Pump Trip (EOC-RPT) instrumentation with a new, integrated digital control system. The new integrated digital protection system implementing the RPS, NSSSS, ECCS, RCIC, and EOC-RPT instrumentation functions is referred to as the PPS. The Anticipated Transient Without Scram (ATWS) instrument sensing, logic, and control functions including ATWS-RPT output is performed by the non-safety related Ovation Distributed Control System (DCS).

Constellation proposes to reinstate previously NRC-approved RICT applications and to apply the existing RICT Program to PPS instrumentation Technical Specification requirements. The DMP License Amendment Request (LAR) revised select RICT applications by restoring associated Completion Times (CTs) to deterministic values for certain instrumentation functions. These revisions did not remove the RICT Program from the Technical Specifications; rather, they reflected a temporary restoration of deterministic CTs pending completion of design and probabilistic risk assessment (PRA) updates. This amendment reinstates those previously approved RICT applications and applies the existing RICT Program to updated PPS-based Technical Specifications representing the same underlying safety functions. The proposed changes are consistent with the plant-specific implementation of Reference 4 and do not alter the previously approved programmatic requirements, methodologies, or bases for RICT evaluation.

The amendment would modify TS requirements related to Completion Times (CTs) for Required Actions (allowed outage times for LGS) to provide the option of applying risk-informed CTs in lieu of deterministic CTs in accordance with the RICT Program. The RICT Program, described in TS Section 6, Administrative Controls, provides the governing requirements for implementing risk-informed CTs.

The methodology for using the RICT Program is described in NEI 06-09-A, Reference 5. Adherence to Reference 5 is required by the RICT Program. The proposed amendment does not revise the underlying RICT program methodology, implementation framework, or probabilistic risk acceptance criteria.

2.0 ASSESSMENT

2.1 Applicability of Published Safety Evaluation

Constellation has reviewed Reference 4 and associated the model safety evaluation, 2018 Reference 6. This review included the information provided to support TSTF-505 and the safety evaluation for NEI 06-09-A. As described in the subsequent paragraphs, Constellation has concluded that the technical basis is applicable to LGS, Units 1 and 2, and provides an adequate basis for approval of the proposed amendment. The proposed amendment reinstates previously approved RICT applications and applies the existing RICT Program to updated TS without changing the underlying methodology or scope of approved safety functions. The reinstated and applied RICT applications remain consistent with the limitations and conditions in Section 4.0 of the NRC safety evaluation for NEI 06-09-A.

2.2 Verifications and Regulatory Commitments

Consistent with Section 4.0, Limitations and Conditions, of the safety evaluation for NEI 06-09-A, the following information is provided to demonstrate that the reinstated and applied RICT applications continue to meet the applicable requirements:

1. Enclosure 1 identifies each of the TS Required Actions to which the RICT Program has been previously approved to apply and is reinstated or applied to, with a comparison of the TS functions to the functions modeled in the probabilistic risk assessment (PRA) of the structures, systems and components (SSCs) subject to those actions.

2. Enclosure 2 provides a discussion of the results of peer reviews and self-assessments conducted for the plant-specific Probabilistic Risk Assessment (PRA) models which support the previously approved RICT Program, as required by Regulatory Guide (RG) 1.200, Section 4.2.

3. Enclosure 5 provides the plant-specific baseline core damage frequency (CDF) and large early release frequency (LERF) to confirm that the potential risk increases allowed under the RICT Program are acceptable.

4. Enclosure 9 provides a discussion of how the key assumptions and sources of uncertainty in the PRA models were identified, and how their impact on the RICT Program was assessed and dispositioned.

5. Enclosure 12 provides a description of the process to identify and provide RMAs.

Enclosure 3 is not provided since each PRA model used for the RICT Program is addressed using a standard endorsed by the NRC and no changes are made to the NRC-approved PRA methodology.

Enclosure 4 is not provided because the justification for excluding sources of risk not addressed by the PRA models was previously established and approved by NRC as part of the original LGS RICT license amendment request and remains applicable to this application. The digital PPS modification does not introduce new sources of risk outside the scope of the PRA models or otherwise change the basis for the previously approved treatment of non-modeled sources of risk.

The LGS RICT Program implementation processes, PRA model update process, real-time risk assessment tool attributes, and monitoring program were also previously established and approved by NRC as part of the original LGS RICT license amendment request. These programmatic elements remain applicable to the RICT Program following implementation of the digital PPS modification, except as supplemented by the digital PPS-specific information provided in this license amendment request. Accordingly, Enclosures 7, 8, 10, and 11 from the original LGS RICT application are not repeated in this submittal.

2.3 Optional Changes and Variations

Constellation is proposing the following variations from the TS changes described in TSTF-505, Revision 2, or the applicable parts of the NRC staff's model safety evaluation dated November 21, 2018. These options were recognized as acceptable variations in TSTF-505 and the NRC staff's model safety evaluation. These variations are administrative or plant-specific in nature and do not constitute revisions to the NRC-approved RICT methodology or program requirements. Additionally, the administrative differences do not affect the reinstatement or application of previously approved RICT applications.

The TSTF-505 markups applicable to LGS are based on NUREG-1433, "Standard Technical Specifications General Electric BWR/4 Plants," which includes Conditions, Required Actions, and Completion Times (CTs) whereas the LGS TS include Actions which are a combination of all three of these (note that CTs are referred to as allowed outage times (AOTs) for LGS). For the purposes of this license amendment request, the terminology used will be consistent with TSTF-505 and NEI 06-09-A as much as possible, except in those places where it is appropriate to use the LGS plant-specific terminology. These differences are administrative and do not affect the applicability of TSTF-505 to the LGS TS.

Note also that, in several instances, the LGS TS use different numbering and titles than the Standard Technical Specifications (STS) on which TSTF-505 was based. These differences are administrative and do not affect the applicability of TSTF-505 to the LGS TS. Only TS changes consistent with the LGS design and TS are included. Attachment 4 provides specific information.

Attachment 4 is a cross reference that provides a comparison between the NUREG-1433 Required Actions included in TSTF-505 and the LGS Actions included in this license amendment request. The cross reference confirms that all RICT applications are either reinstated or applied consistent with previously approved safety function scope. The attachment includes a summary description of the referenced Required Actions, which is provided for information purposes only and is not intended to be a verbatim description of the Required Action. The cross reference identifies the following:

1. LGS Actions that have identical numbers to the corresponding NUREG-1433 Required Actions are not deviations from TSTF-505, except for administrative deviations (if any) such as formatting. These deviations are administrative with no impact on the NRC's model safety evaluation dated November 21, 2018.

2. LGS Actions that have different numbering than the NUREG-1433 Required Actions are an administrative deviation from TSTF-505 with no impact on the NRC's model safety evaluation dated November 21, 2018.

3. For NUREG-1433 Required Actions that are not contained in the LGS TS, the

corresponding TSTF-505 mark-ups for the Required Actions are not applicable to LGS. This is an administrative deviation from TSTF-505 with no impact on the NRC's model safety evaluation dated November 21, 2018.

4. The model application provided in TSTF-505, Revision 2, includes an attachment for typed, camera-ready (revised) TS pages reflecting the proposed changes. LGS is not including such an attachment due to the number of TS pages included in this submittal that have the potential to be affected by other unrelated license amendment requests and the straightforward nature of the proposed changes. Providing only mark-ups of the proposed TS changes satisfies the requirements of 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," in that the mark-ups fully describe the changes desired. This is an administrative deviation from TSTF-505 with no impact on the NRC's model safety evaluation dated November 21, 2018. Because of this deviation, the contents and numbering of the attachments for this amendment request differ from the attachments specified in the model application in TSTF-505.

5. There are several plant-specific LCOs (TS 3.3.1, TS 3.3.2, TS 3.3.4.1, TS 3.3.4.2, TS 3.5.1) and associated Actions for which LGS is proposing to apply the RICT Program that are variations from TSTF-505 as identified in Attachment 4 with additional justification provided below:

TS 3.3.1.a.1
Plant Protection System Instrumentation Channels; number of OPERABLE channels for one or more Functions one less than the Minimum OPERABLE Channels required

TS 3.3.1 plant protections system (PPS) instrumentation combines instruments previously found in TS 3.3.1 Reactor Protection System (RPS) Instrumentation, TS 3.3.2 Isolation Actuation Instrumentation, TS 3.3.5 Reactor Core Isolation Cooling (RCIC) Instrumentation, and TS 3.3.3 Emergency Core Cooling System (ECCS) Actuation Instrumentation. For system level safety actuations, PPS logic architecture is divided into three levels. Level 1 architecture is composed of the four channels, while Levels 2 and 3 together make up the division.

Level 1 PPS logic acquires and processes safety-related input signals, performs bistable determinations, and transmits channel trip status information to the divisional coincidence logic. The remaining sensor channels not directly received by the Bistable Processing Logic (BPL) have a similar process of input, logic operations, and output and are still channels for the purposes of resolution of potential Technical Specification limiting conditions.

For PPS instrumentation functions, a sensor channel includes the field sensor, associated signal processing, bistable determination logic, and communication of trip status to the PPS divisional logic. All sensor channels are bound by TS 3.3.1.

For all functions to which RICT is reinstated or applied, trip capability is maintained by the remaining OPERABLE channels. RICT application is modified by a note that states, "## RICT is not applicable: when trip capability is not maintained for the affected function, OR to functions 3.c.2, 4.c, 11, 12, 35, 36, 37, 38" which excludes specific functions where RICT is not able to be applied.

TS 3.3.1.a.1 is modified by the second condition in the footnote. The first four functions are 3.c.2, 4.c, 11 and 12, which all direct operators to bypass rather than trip the inoperable channel. RICT cannot be applied to performing a bypass. The last four functions, 35, 36, 37, 38 are not modeled in the PRA. Therefore, use of a RICT for this Action will not adversely affect the ability of the PPS instrumentation to perform its intended safety function.

TS 3.3.1.b.1
Plant Protection System Instrumentation Channels; with the number of OPERABLE channels for one or more Functions two or more less than the Minimum OPERABLE Channels required

TS 3.3.1.b.1 Plant Protection System Instrumentation Channels is for number of OPERABLE channels for one or more Functions two or more less than the Minimum OPERABLE Channels required. With more than one PPS channel for a function inoperable, a loss of function may occur. For this reason the RICT application is modified by a note that states, "## RICT is not applicable: when trip capability is not maintained for the affected function, OR to functions 3.c.2, 4.c, 11, 12, 35, 36, 37, 38." Functions 3.c.2, 4.c, 11 and 12, which all direct operators to bypass rather than trip the channel. RICT cannot be applied to performing a bypass. The last four functions, 35, 36, 37, 38 are not modeled in the PRA. Therefore, use of a RICT for this Action will not adversely affect the ability of the PPS instrumentation to perform its intended safety function.

TS 3.3.2.a.1
Plant Protection System Divisions; With one or more reactor trip divisions inoperable

The reactor trip function automatically initiates a reactor scram to preserve fuel cladding integrity, preserve reactor coolant pressure boundary integrity, minimize post-accident energy release, and prevent inadvertent criticality.

The reactor scram logic and actuation is processed by level 2 PPS logic. Level 2 PPS logic receives channel trip status information, performs divisional coincidence logic, applies required manual trip and bypass inputs, and generates divisional reactor trip outputs. Reactor scram functions are generally implemented using redundant coincidence logic such that trip capability is maintained consistent with the applicable TS Actions.

In addition to automatic trip processing, the PPS also supports divisional manual reactor trip actuation.

The other purpose of Level 2 is to receive certain signals that are not processed by Level 1 logic to accommodate design aspects including plant cable routes and scram response times.

All Local Coincidence Logic (LCL) hardware, from the termination of channel input bistable communication paths to outputs to either Integrated Logic Processor (ILP) hardware or the RPS termination units, are within the domain of specification 3.3.2.

When the Scram Matrix logic is satisfied, the Reactor Protection System Termination

Unit (RPS TU) solid state relays are deenergized. The Division 1 and 3 RPS TUs are logically ORed such that if a solid-state relay is deenergized in either division, the power will be removed from the 'A' Scram Solenoid Pilot Valves (SSPVs). Similarly, the Division 2 and 4 RPS TUs are logically ORed such that if a solid-state relay is deenergized in either division, the power will be removed from the 'B' SSPVs. Either case, whether actuated automatically or by way of manual scram pushbuttons in the Main Control Room, results in a half scram. When both occur with overlap in time, a full scram is actuated.

For TS 3.3.2.a.1, trip capability is maintained through the other three divisions. Therefore, use of a RICT for this Action will not adversely affect the ability of the PPS to perform its intended safety function; however, use of a RICT is not permitted when trip capability is not maintained. With more than one PPS division inoperable, certain combinations of inoperable divisions may result in loss of required trip capability and RICT would not be applicable.

3.3.4.1.a
Anticipated Transient Without Scram (ATWS) Recirculation Pump Trip (RPT) System Instrumentation; One less than required minimum OPERABLE channels.

AND

3.3.4.1.b
Anticipated Transient Without Scram (ATWS) Recirculation Pump Trip (RPT) System Instrumentation; Two or more less than required minimum OPERABLE channels.

The TSTF-505 Rev 2 ATWS-RPT specification action is for one or more channels inoperable. The LGS spec has separate actions for both one channel, and more than one channel less than the required minimum number of channels operable. This variation is a difference in format between standard tech specs and the current LGS tech specs. Therefore, application of a RICT for this Action will not adversely affect the ability of the ATWS-RPT to perform its intended safety function.

3.3.4.1.c
Anticipated Transient Without Scram (ATWS) Recirculation Pump Trip (RPT) System Instrumentation; One trip system inoperable.

The ATWS-RPT contributes to the mitigation of the consequences of an ATWS event by tripping the recirculation pumps early in the event, reducing core flow and thereby reducing the core power generation.

Low reactor water level or high reactor pressure PPS signals are isolated and sent to the non-safety Distributed Control System to cause a trip of the recirculation pump drive motor breakers. Inputs for ATWS-RPT function are provided by Reactor Vessel Pressure sensors and Reactor Vessel Water Level - Wide Range Low, Low – Level 2 sensors, using standard 2oo4 voting logic. (Table 3.3.1-1 items 3.a and 4.b respectively). Upon receipt of two valid votes for Reactor Vessel Pressure, or Reactor Vessel Water Level - Wide Range Low, Low – Level 2 following a 9 second time delay, all ATWS-RPT trip coils will energize and both recirculation pump motors will trip. This reduction in core flow protects the vessel and fuel during the ATWS event by limiting core power during the time required for the scram air header to depressurize sufficiently to open the scram valves.

There are two breakers in series in each pump motor feed; the control logic of each breaker is assigned to a separate safety division.

The ATWS-RPT trip circuitry is separate from and independent of the End of cycle recirculation pump trip (EOC-RPT) trip circuitry. Separate trip coils are used in each breaker (one for ATWS-RPT and one for EOC-RPT). The trip coils are fed from Divisional DC power.

TS 3.3.4.1.c is for one ATWS-RPT trip system inoperable. Trip capability is maintained through the other trip system. Therefore, use of a RICT for this Action will not adversely affect the ability of the ATWS-RPT to perform its intended safety function.

3.3.4.2.a
End-of-Cycle Recirculation Pump Trip System Instrumentation; One trip system inoperable.

The purpose of the end-of-cycle recirculation pump trip (EOC-RPT) is to protect the integrity of the fuel cladding during fast pressurization transients, especially turbine trips and generator load rejection events. It supplements the reactor scram function during these events. The trip of the reactor recirculation pumps early in these transient events decreases the magnitude of the power excursion by adding negative reactivity to the core, consequently resulting in lower thermal operating limits.

Each EOC-RPT system trips both recirculation pumps, reducing coolant flow to reduce the void collapse in the core during two of the most limiting pressurization events. The two events for which the EOC-RPT protective feature will function are closure of the turbine stop valves and fast closure of the turbine control valves.

Inputs for EOC RPT function are provided by Turbine Stop Valve-Closure sensors and Turbine Control Valve Fast Closure, Trip Oil Pressure -Low, using standard 2oo4 voting logic. (Table 3.3.1-1 items 20 and 21 respectively). Upon receipt of a valid vote for either parameter, all EOC RPT trip coils will energize.

TS 3.3.4.2.a is for one EOC-RPT trip system inoperable. Trip capability is maintained through the other trip system. Therefore, use of a RICT for this Action will not adversely affect the ability of the EOC-RPT to perform its intended safety function.

3.5.1.d.3
Emergency Core Cooling System Actuation Instrumentation; Either Automatic Depressurization System (ADS) subsystem inoperable.

The ADS automatically controls five of the safety relief valves (SRVs) that are installed on the main steam lines inside the primary containment. The valves are dual-purpose in that they reliable so that the Core Spray (CS) system and/or Low Pressure Coolant Injection (LPCI) system can inject water into the reactor vessel.

The ADS has two independent and redundant subsystems. Each subsystem controls one of the two independent and redundant solenoid valves associated with each ADS valve. The initiating divisions for each subsystem are also redundant.

TS 3.5.1.d.3 Action a and b involves either ADS subsystem subsystem being inoperable. Action a provides a longer completion time if HPCI and the Reactor Core Isolation Cooling (RCIC) systems are operable. If HPCI and RCIC are not operable, then Action b specifies a shorter completion time. In either case, the redundant ADS subsystem is operable under this TS condition. Therefore, use of a RICT for TS 3.5.1.d.3, Actions a or b will not adversely affect the ability of the ADS to perform its intended safety function.

6. For several of the Instrumentation Section 3.3 TS, as noted in the Attachment 2 TS markups, a footnote is added to the proposed statement "or in accordance with the Risk Informed Completion Time Program" to ensure that a RICT is not applied when the actuation/trip function is lost. Under this circumstance, TSTF-505, Rev. 2 specifies the addition of a Note that reads "Not applicable when [all] required [channels] are inoperable." Because maintenance of trip capability depends on both the number and combination of inoperable channels or divisions, Constellation has chosen to replace the TSTF-505 Note with a footnote which reads "Not applicable when trip capability is not maintained." This clarification ensures that RICT is not applied in configurations where required safety functions are not maintained, consistent with the intent of TSTF-505 and the NRC safety evaluation.

Application of a RICT for these plant-specific LCOs will be controlled under the RICT Program. The RICT Program provides the administrative controls necessary to permit risk-informed extension of Completion Times while ensuring risk remains within acceptable regulatory guidelines. This amendment does not revise the RICT Program methodology, probabilistic risk acceptance criteria, or implementation framework previously approved by the NRC. Rather, it reinstates RICT applications that were temporarily revised to deterministic Completion Times in the DMP LAR and applies the existing RICT Program to PPS-based Technical Specifications that represent the same underlying safety functions.

Therefore, Constellation has determined that these proposed changes remain consistent with the applicability and intent of TSTF-505, Revision 2, as previously approved by the NRC, and appropriately reinstate and apply RICT consistent with the approved program basis without modification.

3.0 REGULATORY ANALYSIS

3.1 No Significant Hazards Consideration Determination

For Limerick Generating Station (LGS), Units 1 and 2, the proposed amendment revises plant-specific TS requirements, in part consistent with the Standard Technical Specifications (STS), to allow for the reinstatement and application of Risk-Informed Completion Time (RICT) provisions to selected Required Actions. Specifically, the proposed changes revise TS Completion Time requirements to permit the use of risk-informed Completion Times in accordance with the existing RICT Program described in TS Section 6, “Administrative Controls.” The RICT Program establishes the governing requirements for implementation of risk-informed Completion Times and remains unchanged by this amendment.

As required by 10 CFR 50.91(a), an analysis of the issue of no significant hazards consideration is presented below:

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

   Response: No.

   The proposed changes permit the extension of Completion Times provided the associated risk is assessed and managed in accordance with the NRC approved Risk- Informed Completion Time Program. The proposed changes do not involve a significant increase in the probability of an accident previously evaluated because the changes involve no change to the plant or its modes of operation. The proposed changes do not increase the consequences of an accident because the design-basis mitigation function of the affected systems is not changed and the consequences of an accident during the extended Completion Time are no different from those during the existing Completion Time.

   Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

   Response: No.

   The proposed changes do not change the design, configuration, or method of operation of the plant. The proposed changes do not involve a physical alteration of the plant and no new or different kind of equipment will be installed.

   Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Do the proposed changes involve a significant reduction in a margin of safety?

   Response: No.

   The proposed changes permit the extension of Completion Times provided that risk is assessed and managed in accordance with the NRC approved Risk-Informed Completion Time Program. The proposed changes implement a risk-informed configuration management program to assure that adequate margins of safety are maintained. Application of these new specifications and the configuration management program considers cumulative effects of multiple systems or components being out of service and does so more effectively than the current TS.

   Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

Based on the above, Constellation concludes that the proposed changes present no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

3.2 Conclusions

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

4.0 ENVIRONMENTAL EVALUATION

A review has determined the proposed change qualifies for a categorical exclusion from environmental review in accordance with 10 CFR 51.22. The proposed actions are an amendment regarding the installation on or use of a facility component as described in 10 CFR 51.22(d)(8). The proposed action does not disturb any previously undisturbed ground and there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite, does not result in a significant increase in individual or cumulative public or occupational radiation exposure, and does not result in a significant increase in the potential for or consequences from radiological accidents. Therefore, pursuant to 10 CFR 51.22, neither an environmental assessment nor an environmental impact statement is required.

5.0 REFERENCES

1. U.S. Nuclear Regulatory Commission (NRC) letter to Constellation Energy Generation, LLC (Constellation), "Limerick Generating Station, Units 1 and 2 − Issuance of Amendment Nos. 240 and 203 to Implement TSTF-505, Revision 2, 'Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4B' (EPID L-2018-LLA-0567)," dated February 28, 2020 (NRC Agencywide Documents Access and Management System (ADAMS) Accession No ML20034F637)

2. Constellation letter to the NRC, "License Amendment Request to Revise the Licensing and Design Basis to Incorporate the Replacement of Existing Safety-Related Analog Control Systems with a Single Digital Plant Protection System (PPS)," dated September 26, 2022 (ADAMS Accession No. ML22269A569)

3. Constellation letter to the NRC, "Resubmittal of License Amendment Request to Revise the Licensing and Design Basis to Incorporate the Replacement of Existing Safety-Related Analog Control Systems with a Single Digital Plant Protection System (PPS) –To Address Proprietary Issues with DOE INL HFE Reports," dated September 12, 2023 (ADAMS Accession No. ML23255A095)

4. TSTF Comments on Draft Safety Evaluation for Traveler TSTF-505, "Provide Risk-Informed Extended Completion Times" and Submittal of TSTF-505, Revision 2, dated November 21, 2018 (ADAMS Accession No. ML18183A493).

5. U.S. Nuclear Regulatory Commission (NRC) letter Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, “Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines” (TAC No. MD4995), dated May 17, 2007 (NRC Agencywide Documents Access and Management System (ADAMS) Accession No. ML12286A322)

6. NRC letter "Final Revised Model Safety Evaluation of Traveler TSTF-505, Revision 2, "Provide Risk-Informed Extended Completion Times - RITSTF Initiative 4b,"" dated November 21, 2018 (ADAMS Accession No. ML18253A085).

ATTACHMENT 2

License Amendment Request

Limerick Generating Station, Units 1 and 2
Docket Nos. 50-352 and 50-353

License Amendment Request to Reinstate and Apply Risk-Informed Completion Time (RICT) Applications

<u>Technical Specification Pages Markups</u>

3/4.3.1 PLANT PROTECTION SYSTEM INSTRUMENTATION CHANNELS

LIMITING CONDITION FOR OPERATION

3.3.1 The plant protection system instrumentation channels shown in Table 3.3.1-1 shall be OPERABLE.

APPLICABILITY: As shown in Table 3.3.1-1.

ACTION:

Note: Separate condition entry is allowed for each Function.

a. In OPERATIONAL CONDITIONS 1, 2, and 3, with the number of OPERABLE channels for one or more Functions one less than the Minimum OPERABLE Channels required by Table 3.3.1-1, within 12 hours or for only action a.1 in accordance with the Risk Informed Completion Time Program##:

   1. Place the required inoperable channel in the tripped condition#, or

   2. Initiate all actions identified in Table 3.3.1-1 for the applicable Function, or

   3. Be in at least HOT SHUTDOWN within the following 12 hours, and be in at least COLD SHUTDOWN within the subsequent 24 hours.

b. In OPERATIONAL CONDITIONS 1, 2, and 3, with the number of OPERABLE channels for one or more Functions two or more less than the Minimum OPERABLE Channels required by Table 3.3.1-1, within 6 hours or for only action b.1 in accordance with the Risk Informed Completion Time Program##:

   1. Place the required inoperable channels in the tripped condition#, or

   2. Place one required inoperable channel in the trip condition# and initiate all actions identified in Table 3.3.1-1 for the applicable Function, or

   3. Be in at least HOT SHUTDOWN within the following 12 hours, and be in at least COLD SHUTDOWN within the subsequent 24 hours.

c. In OPERATIONAL CONDITION 4, with the number of OPERABLE channels for one or more Functions less than the Minimum OPERABLE Channels required by Table 3.3.1-1, within 1 hour verify all insertable control rods to be inserted in the core* and lock the reactor mode switch in the Shutdown position within 1 hour.

d. In OPERATIONAL CONDITION 5, with the number of OPERABLE channels for one or more Functions less than the Minimum OPERABLE Channels required by Table 3.3.1-1, within 1 hour place the inoperable channels in the tripped condition, or immediately initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies*.

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* Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

For permissive Functions 3.c.2, 4.c, 11, and 12, Actions a.1 and b.1 are not applicable. For these functional units inoperable channel(s) shall be placed in bypass instead of trip to comply with Action b.2.

RICT is not applicable: when trip capability is not maintained for the affected function, OR to functions 3.c.2, 4.c, 11, 12, 35, 36, 37, 38

3/4.3.2 PLANT PROTECTION SYSTEM DIVISIONS

LIMITING CONDITION FOR OPERATION

3.3.2 The four Plant Protection System divisions shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3, 4, and 5

ACTION:

a. In OPERATIONAL CONDITION 1, 2, or 3:

1. With one or more reactor trip divisions inoperable~~, within 6 hours~~:

a. Place the associated reactor trip units in the tripped condition within 6 hours or in accordance with the Risk Informed Completion Time Program#, or
b. Be in at least HOT SHUTDOWN within the following 12 hours, and be in at least COLD SHUTDOWN within the subsequent 24 hours.

2. With one or more non-reactor trip divisions inoperable, within 6 hours:

a. Declare the associated equipment inoperable, or
b. Be in at least HOT SHUTDOWN within the following 12 hours, and be in at least COLD SHUTDOWN within the subsequent 24 hours.

b. In OPERATIONAL CONDITION 4:

1. With one or more reactor trip divisions inoperable, within 1 hour:

a. Verify all insertable control rods are inserted in the core*, and,
b. Lock the Reactor Mode Switch in the Shutdown position.

2. With one or more non-reactor trip divisions inoperable, within 1 hour:

a. Declare the associated ECCS inoperable if required to be OPERABLE by Specification 3.5.2, and,
b. Declare any associated penetration flow path(s) credited for automatic isolation in calculating DRAIN TIME incapable of automatic isolation.

c. In OPERATIONAL CONDITION 5:

1. With one or more reactor trip divisions inoperable, within 1 hour:

a. Verify all insertable control rods are inserted in the core*, and
b. Suspend all operations involving CORE ALTERATIONS.

2. With one or more non-reactor trip divisions inoperable, within 1 hour:

a. Declare the associated ECCS inoperable if required to be OPERABLE by Specification 3.5.2, and,
b. Declare any associated penetration flow path(s) credited for automatic isolation in calculating DRAIN TIME incapable of automatic isolation.

* Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

\# RICT is not applicable: when trip capability is not maintained

3/4.3.4 RECIRCULATION PUMP TRIP ACTUATION INSTRUMENTATION

ATWS RECIRCULATION PUMP TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.4.1 The anticipated transient without scram recirculation pump trip (ATWS-RPT) system instrumentation channels shown in Table 3.3.4.1-1 shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITION 1.

Note 1: Separate condition entry is allowed for each trip function.

Note 2: For a period of 30 days preceding exit of OPERATIONAL CONDITION 1 at the start of the 2026 refueling outage, the LCO is not applicable when the following conditions are met.

Maximum THERMAL POWER	Maximum Inoperable Safety/Relieve Valves	Minimum Suppression Pool Water Level
90%RTP	0 of 14	23 feet
87%RTP	0 of 14	22 feet
84%RTP	1 of 14	22 feet

Recirc Runback on Level 3 Function is Available and not in Bypass.

ACTION:

a. With the number of OPERABLE channels one less than required by the Minimum OPERABLE Channels requirement, place the inoperable channel(s) in the tripped condition within 24 hours or in accordance with the Risk Informed Completion Time Program*.

b. With the number of OPERABLE channels two or more less than the Minimum OPERABLE Channels, restore at least two channels to OPERABLE status within 1 hour or in accordance with the Risk Informed Completion Time Program*, or be in at least STARTUP within the next 6 hours.

c. With one subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or in accordance with the Risk Informed Completion Time Program, or be in at least STARTUP within the next 6 hours.

d. With both subsystems inoperable, restore at least one subsystem to OPERABLE status within 1 hour or be in at least STARTUP within the next 6 hours.

SURVEILLANCE REQUIREMENTS

4.3.4.1.1 Each of the required ATWS recirculation pump trip system instrumentation channels shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations at the frequencies specified in the Surveillance Frequency Control Program.

4.3.4.1.2 LOGIC SYSTEM FUNCTIONAL TESTS and simulated automatic operation of all channels shall be performed in accordance with the Surveillance Frequency Control Program.

* Not applicable when trip capability is not maintained

END-OF-CYCLE RECIRCULATION PUMP TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.4.2 Two end-of-cycle recirculation pump trip (EOC-RPT) subsystems shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITION 1, when THERMAL POWER is greater than or equal to 29.5% of RATED THERMAL POWER.

ACTION:

a. With one subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or in accordance with the Risk Informed Completion Time Program, or take the ACTION required by Specification 3.2.3.

b. With both subsystems inoperable, restore at least one subsystem to OPERABLE status within one hour, or take the ACTION required by Specification 3.2.3.

SURVEILLANCE REQUIREMENTS

4.3.4.2.1 Verify the Plant Protection System provides a signal from each division to each EOC-RPT subsystem and the recirculation pump trip breakers in accordance with the Surveillance Frequency Control Program.

4.3.4.2.2 The END-OF-CYCLE RECIRCULATION PUMP TRIP SYSTEM RESPONSE TIME of each subsystem shall be demonstrated to be within its limit in accordance with the Surveillance Frequency Control Program. Each test shall include at least the logic of one type of channel input, turbine control valve fast closure, or turbine stop valve closure, such that both types of channel inputs are tested in accordance with the Surveillance Frequency Control Program. The measured time shall be added to the most recent breaker arc suppression time and the resulting END-OF-CYCLE-RECIRCULATION PUMP TRIP SYSTEM RESPONSE TIME shall be verified to be within its limit.

4.3.4.2.3 The time interval necessary for breaker arc suppression from energization of the recirculation pump circuit breaker trip coil shall be measured in accordance with the Surveillance Frequency Control Program.

ACTION: (Continued)

c. For the HPCI system:

1. With the HPCI system inoperable, provided the CSS, the LPCI system, the ADS and the RCIC system are OPERABLE, restore the HPCI system to OPERABLE status within 14 days or in accordance with the Risk Informed Completion Time Program, or be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤ 200 psig within the following 24 hours.

2. With the HPCI system inoperable, and one CSS subsystem, and/or LPCI subsystem inoperable, and provided at least one CSS subsystem, three LPCI subsystems, and ADS are operable, restore the HPCI to OPERABLE within 8 hours or in accordance with the Risk Informed Completion Time Program, or be in HOT SHUTDOWN in the next 12 hours, and in COLD SHUTDOWN in the next 24 hours.

3. Specification 3.0.4.b is not applicable to HPCI.

d. For the ADS:

1. With one of the above required ADS valves inoperable, provided the HPCI system, the CSS and the LPCI system are OPERABLE, restore the inoperable ADS valve to OPERABLE status within 14 days or in accordance with the Risk Informed Completion Time Program, or be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤ 100 psig within the next 24 hours.

2. With two or more of the above required ADS valves inoperable, be in at least HOT SHUTDOWN within 12 hours and reduce reactor steam dome pressure to ≤ 100 psig within the next 24 hours.

3. With either ADS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within:

a) 7 days or in accordance with the Risk Informed Completion Time Program, provided that the HPCI and RCIC Systems are OPERABLE, or

b) 72 hours or in accordance with the Risk Informed Completion Time Program.

Otherwise, be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤ 100 psig within the following 24 hours.

4. With both ADS subsystems inoperable, be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤ 100 psig within the following 24 hours.

3/4.3 INSTRUMENTATION

3/4.3.1 PLANT PROTECTION SYSTEM INSTRUMENTATION CHANNELS

LIMITING CONDITION FOR OPERATION

3.3.1 The plant protection system instrumentation channels shown in Table 3.3.1-1 shall be OPERABLE.

APPLICABILITY: As shown in Table 3.3.1-1.

ACTION:

Note: Separate condition entry is allowed for each Function.

a. In OPERATIONAL CONDITIONS 1, 2, and 3, with the number of OPERABLE channels for one or more Functions one less than the Minimum OPERABLE Channels required by Table 3.3.1-1, within 12 hours or for only action a.1 in accordance with the Risk Informed Completion Time Program##:

   1. Place the required inoperable channel in the tripped condition#, or

   2. Initiate all actions identified in Table 3.3.1-1 for the applicable Function, or

   3. Be in at least HOT SHUTDOWN within the following 12 hours, and be in at least COLD SHUTDOWN within the subsequent 24 hours.

b. In OPERATIONAL CONDITIONS 1, 2, and 3, with the number of OPERABLE channels for one or more Functions two or more less than the Minimum OPERABLE Channels required by Table 3.3.1-1, within 6 hours or for only action b.1 in accordance with the Risk Informed Completion Time Program##:

   1. Place the required inoperable channels in the tripped condition#, or

   2. Place one required inoperable channel in the trip condition# and initiate all actions identified in Table 3.3.1-1 for the applicable Function, or

   3. Be in at least HOT SHUTDOWN within the following 12 hours, and be in at least COLD SHUTDOWN within the subsequent 24 hours.

c. In OPERATIONAL CONDITION 4, with the number of OPERABLE channels for one or more Functions less than the Minimum OPERABLE Channels required by Table 3.3.1-1, within 1 hour verify all insertable control rods to be inserted in the core* and lock the reactor mode switch in the Shutdown position within 1 hour.

d. In OPERATIONAL CONDITION 5, with the number of OPERABLE channels for one or more Functions less than the Minimum OPERABLE Channels required by Table 3.3.1-1, within 1 hour place the inoperable channels in the tripped condition, or immediately initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies*.

---

* Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

For permissive Functions 3.c.2, 4.c, 11, and 12, Actions a.1 and b.1 are not applicable. For these functional units inoperable channel(s) shall be placed in bypass instead of trip to comply with Action b.2.

RICT is not applicable: when trip capability is not maintained for the affected function, OR to functions 3.c.2, 4.c, 11, 12, 35, 36, 37, 38

3/4.3.2 PLANT PROTECTION SYSTEM DIVISIONS

LIMITING CONDITION FOR OPERATION

3.3.2 The four Plant Protection System divisions shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3, 4, and 5

ACTION:

a. In OPERATIONAL CONDITION 1, 2, or 3:

1. With one or more reactor trip divisions inoperable~~, within 6 hours~~:

a. Place the associated reactor trip units in the tripped condition within 6 hours or in accordance with the Risk Informed Completion Time Program#, or
b. Be in at least HOT SHUTDOWN within the following 12 hours, and be in at least COLD SHUTDOWN within the subsequent 24 hours.

2. With one or more non-reactor trip divisions inoperable, within 6 hours:

a. Declare the associated equipment inoperable, or
b. Be in at least HOT SHUTDOWN within the following 12 hours, and be in at least COLD SHUTDOWN within the subsequent 24 hours.

b. In OPERATIONAL CONDITION 4:

1. With one or more reactor trip divisions inoperable, within 1 hour:

a. Verify all insertable control rods are inserted in the core*, and,
b. Lock the Reactor Mode Switch in the Shutdown position.

2. With one or more non-reactor trip divisions inoperable, within 1 hour:

a. Declare the associated ECCS inoperable if required to be OPERABLE by Specification 3.5.2, and,
b. Declare any associated penetration flow path(s) credited for automatic isolation in calculating DRAIN TIME incapable of automatic isolation.

c. In OPERATIONAL CONDITION 5:

1. With one or more reactor trip divisions inoperable, within 1 hour:

a. Verify all insertable control rods are inserted in the core*, and
b. Suspend all operations involving CORE ALTERATIONS.

2. With one or more non-reactor trip divisions inoperable, within 1 hour:

a. Declare the associated ECCS inoperable if required to be OPERABLE by Specification 3.5.2, and,
b. Declare any associated penetration flow path(s) credited for automatic isolation in calculating DRAIN TIME incapable of automatic isolation.

* Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

\# RICT is not applicable: when trip capability is not maintained

3/4.3.4 RECIRCULATION PUMP TRIP ACTUATION INSTRUMENTATION

ATWS RECIRCULATION PUMP TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.4.1 The anticipated transient without scram recirculation pump trip (ATWS-RPT) system instrumentation channels shown in Table 3.3.4.1-1 shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITION 1.

Note 1: Separate condition entry is allowed for each trip function.

Note 2: For a period of 30 days preceding exit of OPERATIONAL CONDITION 1 at the start of the 2027 refueling outage, the LCO is not applicable when the following conditions are met.

Maximum THERMAL POWER	Maximum Inoperable Safety/Relieve Valves	Minimum Suppression Pool Water Level
90%RTP	0 of 14	23 feet
87%RTP	0 of 14	22 feet
84%RTP	1 of 14	22 feet

Recirc Runback on Level 3 Function is Available and not in Bypass.

ACTION:

a. With the number of OPERABLE channels one less than required by the Minimum OPERABLE Channels requirement, place the inoperable channel(s) in the tripped condition within 24 hours or in accordance with the Risk Informed Completion Time Program*.

b. With the number of OPERABLE channels two or more less than the Minimum OPERABLE Channels, restore at least two channels to OPERABLE status within 1 hour or in accordance with the Risk Informed Completion Time Program*, or be in at least STARTUP within the next 6 hours.

c. With one subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or in accordance with the Risk Informed Completion Time Program, or be in at least STARTUP within the next 6 hours.

d. With both subsystems inoperable, restore at least one subsystem to OPERABLE status within 1 hour or be in at least STARTUP within the next 6 hours.

SURVEILLANCE REQUIREMENTS

4.3.4.1.1 Each of the required ATWS recirculation pump trip system instrumentation channels shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations at the frequencies specified in the Surveillance Frequency Control Program.

4.3.4.1.2 LOGIC SYSTEM FUNCTIONAL TESTS and simulated automatic operation of all channels shall be performed in accordance with the Surveillance Frequency Control Program.

* Not applicable when trip capability is not maintained

END-OF-CYCLE RECIRCULATION PUMP TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.4.2 Two end-of-cycle recirculation pump trip (EOC-RPT) subsystems shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITION 1, when THERMAL POWER is greater than or equal to 29.5% of RATED THERMAL POWER.

ACTION:

a. With one subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or in accordance with the Risk Informed Completion Time Program, or take the ACTION required by Specification 3.2.3.

b. With both subsystems inoperable, restore at least one subsystem to OPERABLE status within one hour, or take the ACTION required by Specification 3.2.3.

SURVEILLANCE REQUIREMENTS

4.3.4.2.1 Verify the Plant Protection System provides a signal from each division to each EOC-RPT subsystem and the recirculation pump trip breakers in accordance with the Surveillance Frequency Control Program.

4.3.4.2.2 The END-OF-CYCLE RECIRCULATION PUMP TRIP SYSTEM RESPONSE TIME of each subsystem shall be demonstrated to be within its limit in accordance with the Surveillance Frequency Control Program. Each test shall include at least the logic of one type of channel input, turbine control valve fast closure, or turbine stop valve closure, such that both types of channel inputs are tested in accordance with the Surveillance Frequency Control Program. The measured time shall be added to the most recent breaker arc suppression time and the resulting END-OF-CYCLE-RECIRCULATION PUMP TRIP SYSTEM RESPONSE TIME shall be verified to be within its limit.

4.3.4.2.3 The time interval necessary for breaker arc suppression from energization of the recirculation pump circuit breaker trip coil shall be measured in accordance with the Surveillance Frequency Control Program.

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

c. For the HPCI system:

1. With the HPCI system inoperable, provided the CSS, the LPCI system, the ADS and the RCIC system are OPERABLE, restore the HPCI system to OPERABLE status within 14 days or in accordance with the Risk Informed Completion Time Program, or be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤ 200 psig within the following 24 hours.

2. With the HPCI system inoperable, and one CSS subsystem, and/or LPCI subsystem inoperable, and provided at least one CSS subsystem, three LPCI subsystems, and ADS are operable, restore the HPCI to OPERABLE within 8 hours or in accordance with the Risk Informed Completion Time Program, or be in HOT SHUTDOWN in the next 12 hours, and in COLD SHUTDOWN in the next 24 hours.

3. Specification 3.0.4.b is not applicable to HPCI.

d. For the ADS:

1. With one of the above required ADS valves inoperable, provided the HPCI system, the CSS and the LPCI system are OPERABLE, restore the inoperable ADS valve to OPERABLE status within 14 days or in accordance with the Risk Informed Completion Time Program, or be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤ 100 psig within the next 24 hours.

2. With two or more of the above required ADS valves inoperable, be in at least HOT SHUTDOWN within 12 hours and reduce reactor steam dome pressure to ≤ 100 psig within the next 24 hours.

3. With either ADS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within:

   a) 7 days or in accordance with the Risk Informed Completion Time Program, provided that the HPCI and RCIC Systems are OPERABLE, or

   b) 72 hours or in accordance with the Risk Informed Completion Time Program.

   Otherwise, be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤ 100 psig within the following 24 hours.

4. With both ADS subsystems inoperable, be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤ 100 psig within the following 24 hours.

ATTACHMENT 3

License Amendment Request

Limerick Generating Station, Units 1 and 2
Docket Nos. 50-352 and 50-353

License Amendment Request to Reinstate and Apply Risk-Informed Completion Time (RICT) Applications

Technical Specification Bases Pages

Technical Specifications (TS) Bases (for information only)

The following show the proposed statements that will be added when revising the TS Bases sections consistent with TSTF-505, Revision 2, "Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b."

TS B 3.3.1 Plant Protection System Instrumentation Channels

Action a is entered for those times where Applicability is true and one sensor less than the required minimum operable channels is inoperable for one or more functions. In Operating Conditions 1, 2, or 3, if one of the required channels is inoperable then within 12 hours, or for only action a.1 in accordance with the Risk Informed Completion Time (RICT) Program, one of three actions must be taken: place the inoperable channel in trip; initiate the actions for the channel in Table 3.3.1-1, or shutdown the unit within the following 12 hours.

Action b is entered for those times where Applicability is true and more than one sensor has failed for one or more functions. In this condition, the remaining channels can perform the safety function, but without redundancy present. Therefore, 6 hours, or for only action b.1 in accordance with Risk Informed Completion Time Program, to implement one of the three options is appropriate. In contrast to action a, if option 2 is selected it will always be accommodated by tripping one of the inoperable channels as well, subject to # footnote modifications discussed below.

TS B 3.3.1 Plant Protection System Instrumentation Channels, Footnote

Footnote ## has been provided to note that RICT is not applicable when trip capability has not been maintained, and also elaborates on which functions perform a permissive function. Both qualifiers are excluded from RICT applications.

TS B 3.3.2 Plant Protection System Divisions

Action a.1.a requires placing associated trip units in a tripped condition within 6 hours or in accordance with Risk Informed Completion Time Program.

TS B 3.3.2 Plant Protection System Divisions, Footnote

Footnote # excludes cases where trip capability is not maintained.

TS B 3.3.4.1 Recirculation Pump Trip Actuation Instrumentation - ATWS Recirculation Pump Trip System Instrumentation

Action a is entered in OPCON 1 and one sensor less than the required minimum operable channels is inoperable for one or more functions. A trip is required to be inserted within 24 hours or within the Risk Informed Completion Time Program.

Action b is entered in OPCON 1 and two or more sensors less than the required minimum operable channels are inoperable for one or more functions. A trip is required to be inserted within 6 hours or within the Risk Informed Completion Time Program.

Action c is entered in OPCON 1 and one subsystem less than the required minimum operable are inoperable for one or more functions. A trip is required to be inserted within 6 hours or within the Risk Informed Completion Time Program.

TS B 3.3.4.1 Recirculation Pump Trip Actuation Instrumentation - ATWS Recirculation Pump Trip System Instrumentation, Footnote

Footnote * has been provided to indicate that a RICT is not applicable when trip capability is not maintained.

ATTACHMENT 4

License Amendment Request

Limerick Generating Station, Units 1 and 2
Docket Nos. 50-352 and 50-353

License Amendment Request to Reinstate and Apply Risk-Informed Completion Time (RICT) Applications

<u>Cross-Reference of TSTF-505 and Limerick Generating Station Technical Specifications</u>

Note: Limerick Generating Station (LGS) has not implemented the Improved Standard Technical Specifications (STS) of NUREG-1433 in a section-for-section manner. As a result, several LGS Technical Specification (TS) structures and numbering conventions differ from the STS used in TSTF-505. Where differences exist, the STS/TSTF references shown in this cross-reference reflect the corresponding LGS TS requirements based on functional equivalency rather than direct numeric alignment. These differences are administrative in nature and do not affect the applicability of TSTF-505 or the associated NRC safety evaluation.

The term “Condition” is used in this License Amendment Request to denote the circumstances under which the TS Limiting Condition for Operation (LCO) is not met. The term “Required Actions” is used consistent with the LGS TS format to describe the actions necessary to restore compliance or enter the appropriate shutdown condition. For the purposes of this License Amendment Request, the terms “Completion Time (CT)” and “Allowed Outage Time (AOT)” are used interchangeably.

In several locations, LGS has plant-specific TS (e.g., PPS divisional instrumentation, ATWS-RPT, EOC-RPT, and ADS) whose structure, architecture, or Required Actions differ from the STS, even where a similar functional title appears in NUREG-1433. Consistent with the TSTF-505 model application, LGS proposes to apply Risk-Informed Completion Times to these plant-specific TS only where the TS explicitly allows use of the RICT Program. For the Attachment 4 cross-reference, only digital instrumentation functions that receive a PPS digital modernization upgrade and rely on the new LGS RICT Program are included.

Cross Reference of TSTF-505 and
Limerick Generating Station (LGS) Technical Specifications

Tech Spec Condition / Description	**TSTF-505 Tech Spec**	**LGS Tech Spec**	**Apply RICT?**	**Comments**
Completion Times	**1.3**	**--------**		LGS TS do not include an STS Section 1.3. No changes are required to LGS TS to incorporate the TSTF-505 Completion Times.
Example 1.3-8	1.3-8	**--------**		The LGS TS do not contain a section with examples. This example will not be added to the LGS TS.
REACTOR PROTECTION SYSTEM (RPS) INSTRUMENTATION	**3.3.1.1**	**3.3.1**		**LGS TS 3.3.1 is titled "Plant Protection System Instrumentation Channels"**
The number of OPERABLE channels for one or more Functions one less than the minimum OPERABLE Channels required by Table 3.3.1-1	-----------	3.3.1.a	Yes	This is a plant-specific condition for which the number of operable channels for one or more functions being one less than the minimum operable channels required by Table 3.3.1-1. The actions are to (1.) place the required inoperable channel in the tripped condition <u>or</u> (2.) initiate all actions identified in Table 3.3.1-1 for the applicable function <u>or</u> (3.) be in at least hot shutdown within the following 12 hours, and be in at least cold shutdown within the subsequent 24 hours. LGS proposes to apply a RICT to the existing LGS TS 3.3.1, Action a.1. This is acceptable because the TSTF

Cross Reference of TSTF-505 and
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Tech Spec Condition / Description	TSTF-505 Tech Spec	LGS Tech Spec	Apply RICT?	Comments
				states that there may also be plant-specific TS to which changes of the type presented in the TSTF may be applied. Consistent with footnote ##, a RICT will not be applied for the specific functions identified in footnote ## because those functions either meet the TSTF-505, Revision 2 exclusion criteria or are not modeled in the PRA.
The number of OPERABLE channels for one or more Functions two or more less than the minimum OPERABLE Channels required by Table 3.3.1-1	-----------	3.3.1.b	Yes	This is a plant-specific condition for which the number of operable channels for one or more functions being two or more less than the minimum operable channels required by Table 3.3.1-1. The actions are to (1.) place the required inoperable channel in the tripped condition <u>or</u> (2.) place one required inoperable channel in the trip condition and initiate all actions identified in Table 3.3.1-1 for the applicable Function, <u>or</u> (3.) be in at least hot shutdown within the following 12 hours, and be in at least cold shutdown within the subsequent 24 hours. LGS proposes to apply a RICT to the existing LGS TS 3.3.1, Action b.1. This is acceptable because the TSTF states that there may also be plant-specific TS to which

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Tech Spec Condition / Description	TSTF-505 Tech Spec	LGS Tech Spec	Apply RICT?	Comments
				changes of the type presented in the TSTF may be applied. Consistent with footnote ##, a RICT will not be applied when trip capability is not maintained for the affected function or for the specific functions identified in footnote ## because those functions either meet TSTF-505, Revision 2 exclusion criteria or are not modeled in the PRA.
PLANT PROTECTION SYSTEM (PPS) INSTRUMENTATION DIVISIONS	**-----------**	**3.3.2**		**This is a plant-specific PPS instrumentation specification for which the divisional architecture and associated Required Actions differ from the Improved STS. LGS TS 3.3.2 includes conditions for an inoperable PPS reactor trip division and an inoperable PPS non-reactor trip division. A RICT is applied to Conditions 3.3.2.a.1 when the required PPS trip or actuation function remains available. A RICT will not be applied when the condition results in loss of a required PPS function.**

Cross Reference of TSTF-505 and
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Tech Spec Condition / Description	TSTF-505 Tech Spec	LGS Tech Spec	Apply RICT?	Comments
One or more reactor trip divisions inoperable	-----------	3.3.2.a.1	Yes	This condition represents a divisional PPS reactor trip instrumentation inoperability. The required PPS reactor trip function remains available as long as at least one division capable of generating the required trip remains OPERABLE. A RICT is applied to this condition consistent with TSTF-505 when function capability is maintained. A RICT will not be applied if the inoperability results in loss of the required PPS reactor trip function.
ATWS-RPT System Instrumentation	**3.3.4.2**	**3.3.4.1**		**LGS TS 3.3.4.1 is titled** **Recirculation Pump Trip Actuation Instrumentation ATWS Recirculation Pump Trip System Instrumentation**
The number of OPERABLE channels one less than required by the Minimum OPERABLE Channels required by Table 3.3.4.1-1	-----------	3.3.4.1.a	Yes	This is a plant-specific ATWS Recirculation Pump Trip (RPT) instrumentation condition in which one required channel is inoperable. The required ATWS-RPT trip function remains available as long as the remaining channels continue to meet the minimum OPERABLE requirement of Table 3.3.4.1-1. LGS TS 3.3.4.1.a permits the use of the Risk Informed Completion Time Program as an alternative to the 24-hour Completion

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Tech Spec Condition / Description	**TSTF-505 Tech Spec**	**LGS Tech Spec**	**Apply RICT?**	**Comments**
				Time. A RICT will not be applied when the inoperability results in loss of the required ATWS-RPT function.
The number of OPERABLE channels two or more less than the Minimum OPERABLE Channels required by Table 3.3.4.1-1	-----------	3.3.4.1.b	Yes	This condition represents a greater level of ATWS-RPT instrumentation channel inoperability, but the ATWS-RPT function remains available provided that at least the minimum number of channels required to generate the trip are still OPERABLE. LGS TS 3.3.4.1.b explicitly allows the Risk Informed Completion Time Program as an alternative to the 1-hour Completion Time to restore operability or enter STARTUP. A RICT will not be applied when the condition results in loss of the ATWS-RPT trip function.
One subsystem inoperable required by Table 3.3.4.1-1	-----------	3.3.4.1.c	Yes	The ATWS-RPT system consists of two subsystems, either of which can provide the required RPT function. When one subsystem is inoperable, the other subsystem must remain OPERABLE to retain the required ATWS-RPT capability. LGS TS 3.3.4.1.c allows use of the Risk Informed Completion Time Program in lieu of the 72-hour

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Tech Spec Condition / Description	**TSTF-505 Tech Spec**	**LGS Tech Spec**	**Apply RICT?**	**Comments**
				Completion Time for restoring the inoperable subsystem. A RICT will not be applied if the condition results in loss of the required ATWS-RPT function, such as both subsystems being inoperable.
End-of-Cycle Recirculation Pump Trip (EOC-RPT) System Instrumentation	**3.3.4.1**	**3.3.4.2**		**LGS TS 3.3.4.2 is titled Recirculation Pump Trip Actuation Instrumentation End-Of-Cycle Recirculation Pump Trip System Instrumentation**
One subsystem inoperable	-----------	3.3.4.2.a	Yes	The EOC-RPT function remains available when one subsystem is inoperable provided the remaining subsystem is OPERABLE. LGS TS 3.3.4.2 allows the use of the Risk Informed Completion Time Program as an alternative to the 72-hour Completion Time. A RICT will not be applied when the condition results in loss of the required EOC-RPT function, such as both subsystems being inoperable.

Cross Reference of TSTF-505 and
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Tech Spec Condition / Description	TSTF-505 Tech Spec	LGS Tech Spec	Apply RICT?	Comments
ECCS – Operating	**3.5.1**	**3.5.1**		
One ADS subsystem inoperable, provided the HPCI AND RCIC Systems are operable	-----------	3.5.1.d.3.a	Yes	This is a plant-specific ADS condition associated with the digital PPS architecture. The ADS consists of two electrically and physically separate subsystems, either of which is capable of actuating the required ADS valves. With one ADS subsystem inoperable, the redundant ADS subsystem remains available to perform the ADS safety function. LGS TS 3.5.1.d.3.a allows use of the Risk Informed Completion Time Program as an alternative to the 7-day Completion Time when HPCI and RCIC are OPERABLE. A RICT will not be applied when the condition results in loss of the required ADS function, such as both ADS subsystems being inoperable.
One ADS subsystem inoperable	-----------	3.5.1.d.3.b	Yes	This is a plant-specific ADS condition associated with the digital PPS architecture. The ADS consists of two electrically and physically separate subsystems, either of which is capable of actuating the required ADS valves.

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Tech Spec Condition / Description	TSTF-505 Tech Spec	LGS Tech Spec	Apply RICT?	Comments
				With one ADS subsystem inoperable, the redundant ADS subsystem remains available to perform the ADS safety function. LGS TS 3.5.1.d.3.b allows use of the Risk Informed Completion Time Program as an alternative to the 72-hour Completion Time. A RICT will not be applied when the condition results in loss of the required ADS function, such as both ADS subsystems being inoperable.

ATTACHMENT 5

License Amendment Request

Limerick Generating Station, Units 1 and 2
Docket Nos. 50-352 and 50-353

License Amendment Request to Reinstate and Apply
Risk-Informed Completion Time (RICT) Applications

<u>Information Supporting Instrumentation Redundancy and Diversity</u>

The following tables identify the Technical Specification (TS) instrumentation functions affected by the Digital Modernization Project (DMP) and document the associated protection functions, credited safety-analysis events, and diverse or manual actions that remain available under the digital system architecture. The tables reflect the TS requirements and identify the corresponding actuation logic and operator actions credited to satisfy the system functional requirements following the transition from analog to digital instrumentation. This documentation demonstrates that the digital replacements preserve the protection functions, independence, and diversity relied upon in the licensing basis and the Risk-Informed Completion Time (RICT) program.

The tables present the TS instrumentation functions, the transients and accidents for which each function provides protection, the automatic actuation paths available through the Protection System (PPS), and the diverse or manual actions available through the Diverse Protection System (DPS), Ovation, or Main Control Room operator actions. Where the digital architecture provides an alternative diverse actuation capability (e.g., DPS-initiated valve closure or manual operation of system isolation valves), these functions are explicitly identified. This information ensures that the diverse and manual capabilities included in the RICT evaluations remain supported and effective following implementation of the DMP.

LGS TS Section 3.3 Limiting Conditions for Operation (LCOs) were developed to ensure sufficient redundancy and diversity and to satisfy the “single failure” design criterion of IEEE-279-1971 and the independence requirements of Appendix A, General Design Criterion (GDC) 22, “Protection System Independence.” The information in this attachment demonstrates that the digital replacements continue to meet these design bases by providing independent trip channels, diverse actuation paths, and operator manual actions that remain available to accomplish the credited safety functions.

Limerick PPS Instrumentation TS Table 3.3.1-1 Diversity

TS Table	PPS Instrumentation Function	Credited Safety Analysis Event	Event	Diverse PPS/DPS/Ovation Instrumentation
TABLE 3.3.1-1	1. Intermediate Range Monitors (a):			
	a. Neutron Flux High	None (RBM Credited)	AOO	Manual SCRAM (Pushbuttons or Rx MODE Switch)
	b. Inoperative	None (RBM Credited)	AOO	Manual SCRAM
TABLE 3.3.1-1	2. Average Power Range Monitors (b):			
	a. Neutron Flux - Upscale (Setdown)	None (RBM Credited)	AOO	Function 3.a / Manual SCRAM
	b. Simulated Thermal Power - Upscale			
	i. Two Recirculation Loop Operation	None	AOO	Function 3.a / Manual SCRAM
	ii. Single Recirculation Loop Operation (e)	None	AOO	Function 3.a / Manual SCRAM
	c. Neutron Flux - Upscale	Abnormal Startup of Idle Recirculation Pump Recirculation Flow Control Failure - Increasing Flow	AOO AOO	Function 3.a / Manual SCRAM Function 3.a / Manual SCRAM
	d. Inoperative	Same as 2.c		Manual SCRAM
	e. 2-Out-Of-4 Voter	Same as 2.c		Manual SCRAM
	f. OPRM Upscale	Core Thermal Hydraulic Instability		Function 3.a / Manual SCRAM
TABLE 3.3.1-1	3. Reactor Vessel Pressure			
	a. Reactor Vessel Steam Dome Pressure - High	Loss of Stator Cooling	AOO	Function 2.c/Manual SCRAM/RRCS-ARI Initiation
	b. Reactor Vessel Pressure - High (RHR-SDC Cut-In)	Prevent RHR System Overpressurization (UFSAR Section 7.6.1.2)	ISLOCA	Manually Close RHR SDC PCIV's if RHR is Operating / Manually Close from DPS
	c. Reactor Vessel Pressure - Low 1. LOCA (Permissive)	LOCA	DBA	Function 4.a/Manual LPCI Initiation
	d. HPCI Steam Supply Pressure - Low	Auto Closes Steam Supply & Vac, Bkr. PCIV's Isolates HPCI Due to Lack of Motive Steam Pressure to Effectively Function (UFSAR Section 6.2 & Table 6.2-1.7)	LOCA	Manually Close HPCI PCIV's to Stop HPCI System Operation/Manual Inboard HPCI Steam Admission PCIV Closure from DPS
	e. RCIC Steam Supply Pressure - Low	Auto Closes Steam Supply & Vac, Bkr. PCIV's Isolates RCIC Due to Lack of Motive Steam Pressure to Effectively Function (UFSAR Section 6.2 & Table 6.2-1.7)	LOCA	Manually Close RCIC PCIV's to Stop RCIC System Operation/Manual Inboard RCIC Steam Admission PCIV Closure from DPS

Limerick PPS Instrumentation TS Table 3.3.1-1 Diversity

TABLE 3.3.1-1	4. Reactor Vessel Water Level - Wide Range a. Low, Low, Low Level 1	**Core Spray** LOCA	DBA	Functions 8 and 3.c.2 / Manual CS System Initiation & EDG Start / DPS Initiation of 'A' CS Loop Only / Manually Operate 'A' Core Spray Loop from DPS
		RHR LPCI Mode LOCA	DBA	Functions 8 and 3.c.1 / Manual LPCI Initiation / Manually Operate 'A' RHR-LPCI from DPS
		ADS LOCA	DBA	Redundant Division Trip System Initiates ADS Valve Actuation / Manually Operate S, H, M, E, K, B, J, C SRV's from DPS
		Main Steam Isolation LOCA (UFSAR 15.6.5)	DBA	Function 22 / Manual Initiation to Close MSIV's & Normally Closed MSL Drain PCIV's/DPS Initiation of MSIV Closure/Manually Close MSIV's and Inboard Main Steam Line Drain PCIV from DPS
		NSSSS Group 7 - Primary Containment Instrument Gas/TIP Nitrogen Purge Isolation LOCA (UFSAR Section 15.6.5)	DBA	Functions 8, 36 / Manually Close PCIV's
		NSSSS Group 8 - Drywell Chilled Water / Reactor Enclosure Cooling Water Isolation LOCA (UFSAR Section 15.6.5)	DBA	Function 8 / Manually Close PCIV's
	b. Low, Low Level 2	**RWCU** LOCA (UFSAR Section 15.6.5)	DBA	Manually Close RWCU PCIV's & Normally Closed RWCU Sample PCIV's/Manually Close RWCU PCIV's from DPS
		HPCI LOCA	DBA AOO	Function 8 / Manual HPCI Initiation. ADS Provides System Level Redundancy Manual HPCI Initiation. RCIC Provides System Level Redundancy
		RCIC High Pressure RPV Coolant Injection Source	AOO	Manual RCIC Initiation. HPCI Provides System Level Redundancy
		Main Steam Isolation LOCA (UFSAR 15.6.5)	DBA	Manually Close Normally-Closed Main Steam Sample PCIV's
		NSSSS Group 1 - RPV Coolant Sample Valve LOCA (UFSAR 15.6.5)	DBA	Manually Close (Normally Closed) Sample PCIV's
		NSSSS Group 6 - Primary Containment Purge/N2 Inerting Systems/Rad Monitoring/Containment Sampling LOCA (UFSAR 15.6.5)	DBA	Functions 8, 36, 37, 38 / Manually Close PCIV's
		NSSSS Group 7 - Primary Containment Instrument Gas/TIP Nitrogen Purge LOCA (UFSAR 15.6.5)	DBA	Functions 8, 36 / Manually Close PCIV's
		NSSSS Group 8 - Drywell Equipment/Floor Drain System/TIP Retraction/SP Cleanup LOCA (UFSAR 15.6.5)	DBA	Function 8 / Manually Close PCIV's

Limerick PPS Instrumentation TS Table 3.3.1-1 Diversity

TABLE 3.3.1-1	5. Reactor Vessel Water Level - Narrow Range a. Low - Level 3	**RPS** Loss of All Feedwater Flow FWLB Outside Primary Containment **ADS (Permissive)** LOCA **RHR-SDC Mode Isolation** Unanticipated RPV Water Inventory Loss Isolates System RPV Flow Diversion to Radwaste RHR System Sample Valves	 AOO DBA DBA N/A N/A N/A	 Manual SCRAM / RRCS-ARI Initiation Manual SCRAM / RRCS-ARI Initiation Redundant Division Trip System Initiates ADS Valve Actuation / Manually Operate S, H, M, E, K, B, J, C SRV's from DPS Manually Close RHR-SDC PCIV's if RHR is Operating in the SDC Mode to Isolate a Possible RPV Inventory Loss Source Function 8 / Manual Closure to Prevent RHR System Flow Diversion Function 8 / Manual Closure if Sampling
TABLE 3.3.1-1	6. Scram Discharge Volume Water Level - High a. Level Transmitter b. Float Switch	 None None	 None None	 Function 6b / Manual SCRAM Function 6a / Manual SCRAM
TABLE 3.3.1-1	7. Reactor Mode Switch Position	None	N/A	Manual SCRAM Pushbuttons / Manual RRCS-ARI Initiation from Ovation
TABLE 3.3.1-1	8. Drywell Pressure - High	**RPS** LOCA **Core Spray** LOCA **RHR LPCI Mode** LOCA **ADS** LOCA **HPCI** LOCA **NSSSS Group 6 - Primary Containment Purge/N2 Inerting Systems/Rad Monitoring/Containment Sampling** LOCA (UFSAR 15.6.5) **NSSSS Group 7 - Primary Containment Instrument Gas** **TIP Nitrogen Purge** LOCA (UFSAR 15.6.5) **NSSSS Group 8 - Drywell Chilled Water/Reactor Enclosure Cooling Water** **Drywell Equipment/Floor Drain System/TIP Retraction/SP Cleanup** LOCA (UFSAR 15.6.5)	 DBA DBA DBA DBA DBA DBA DBA DBA DBA DBA	 Function 5a / Manual SCRAM Function 4a / Manual CS System Initiation & EDG Start / DPS Initiation of 'A' CS Loop Only / Manually Operate 'A' Loop Core Spray from DPS Function 4a / Manual LPCI Initiation / Manually Operate 'A' RHR-LPCI from DPS Redundant Division Trip System Initiates ADS Valve Actuation / Manually Operate S, H, M, E, K, B, J, C SRV's from DPS Function 4a / Manual HPCI Initiation. ADS Provides System Level Redundancy / RCIC Provides System Level Redundancy Functions 4b, 36, 37, 38 / Manually Close PCIV's Functions 4a, 36 / Manually Close PCIV's Functions 4b, 36 / Manually Close PCIV's Function 4a / Manually Close PCIV's Function 4B / Manually Close PCIV's
TABLE 3.3.1-1	9. Primary Containment Instrument Gas Line to Drywell Δ Pressure - Low	**LOCA (UFSAR 15.6.5)**	DBA	Manually Close PCIG to ADS PCIV's

Limerick PPS Instrumentation TS Table 3.3.1-1 Diversity

TABLE 3.3.1-1	10. Condensate Storage Tank Level - Low	**HPCI** High Pressure RPV Coolant Injection System Initial Water Source Auto Transfers Water Source to Suppression Pool When CST Water Inventory is Low or During a Seismic Event **RCIC** High Pressure RPV Coolant Injection System Initial Water Source Auto Transfers Water Source to Suppression Pool When CST Water Inventory is Low or During a Seismic Event	AOO DBA AOO	Manual HPCI Suction Transfer from CST to Suppression Pool Manual HPCI Suction Transfer from CST to Suppression Pool Manual RCIC Suction Transfer from CST to Suppression Pool Manual RCIC Suction Transfer from CST to Suppression Pool
TABLE 3.3.1-1	13. Suppression Pool Water Level - High	Limits Volume of Water Added to Suppression Pool to Prevent Excessive Containment Loads	AOO DBA	Manual HPCI Suction Transfer from CST to Suppression Pool
TABLE 3.3.1-1	14. HPCI Steam Line Δ Pressure - High	HPCI Pipe Break (UFSAR Section 3.6.1 and Table 3.6-1)	HELB	Functions 3d, 16, 17, 18 / Manual Initiation to Close HPCI PCIV's/Manual Inboard HPCI Steam Admission PCIV Closure from DPS
TABLE 3.3.1-1	15. HPCI Turbine Exhaust Diaphragm Pressure - High	Isolates HPCI for Leakage and Equipment Protection (UFSAR Section 7.3.1.1.2.4.12)	None	Functions 3d, 16, 17, 18 / Manual Initiation to Close HPCI PCIV's/Manual Inboard HPCI Steam Admission PCIV Closure from DPS
TABLE 3.3.1-1	16. HPCI Equipment Room Temperature - High	HPCI Pipe Break (UFSAR Section 3.6.1 and Table 3.6-1)	HELB	Functions 3d, 14, 17, 18 / Manual Initiation to Close HPCI PCIV's/Manual Inboard HPCI Steam Admission PCIV Closure from DPS
TABLE 3.3.1-1	17. HPCI Equipment Room Δ Temperature - High	HPCI Pipe Break (UFSAR Section 3.6.1 and Table 3.6-1)	HELB	Functions 3d, 14, 16, 18 / Manual Initiation to Close HPCI PCIV's/Manual Inboard HPCI Steam Admission PCIV Closure from DPS
TABLE 3.3.1-1	18. HPCI Pipe Routing Area Temperature - High	HPCI Pipe Break (UFSAR Section 3.6.1 and Table 3.6-1)	HELB	Functions 3d, 14, 16, 17 / Manual Initiation to Close HPCI PCIV's/Manual Inboard HPCI Steam Admission PCIV Closure from DPS
TABLE 3.3.1-1	19. Main Steam Line Isolation Valve - Closure	MSIV Closure MSLB Outside Primary Containment	AOO DBA	Functions 2c, 3a / Manual SCRAM / Manual RRCS-ARI Initiation from Ovation Function 5 / Manual SCRAM / Manual RRCS-ARI Initiation from Ovation
TABLE 3.3.1-1	20. Turbine Stop Valve - Closure	Feedwater Max Demand Controller Failure Pressure Regulator Fails Open Turbine Trip Loss of Condenser Vacuum Both Recirculation Pups Trip	AOO AOO AOO AOO AOO	Functions 2c, 3a, 21 / Manual SCRAM / Manual RRCS-ARI Initiation from Ovation Functions 3a, 19, 21 / Manual SCRAM / Manual RRCS-ARI Initiation from Ovation Functions 2c, 3a, 21 / Manual SCRAM / Manual RRCS-ARI Initiation from Ovation Functions 2c, 3a, 19, 21 / Manual SCRAM / Manual RRCS-ARI Initiation from Ovation Functions 3a, 21 / Manual SCRAM / Manual RRCS-ARI Initiation from Ovation
TABLE 3.3.1-1	21. Turbine Control Valve Fast Closure, Trip Oil Pressure - Low	Generator Trip or Load Reject Loss of AC Power (LOOP) Failure of RHR Shutdown Cooling	AOO AOO DBA	Functions 2c, 3a, 20 / Manual SCRAM / Manual RRCS-ARI Initiation from Ovation Functions 2c, 3a, 20 / Manual SCRAM / Manual RRCS-ARI Initiation from Ovation Functions 2c, 3a, 20 / Manual SCRAM / Manual RRCS-ARI Initiation from Ovation
TABLE 3.3.1-1	22. Main Steam Line Pressure - Low	Pressure Regulator Fails Open (UFSAR Section 15.1.3)	AOO	Manually Close MSIV's & Normally Closed MSL Drain PCIV's/DPS Initiation of MSIV Closure/Manual Closure of MSIV's and Inboard Main Steam Line Drain PCIV from DPS
TABLE 3.3.1-1	23. Main Steam Line Flow - High	MSLB Outside Primary Containment (UFSAR Section 15.6.4)	DBA	Function 25 / Manually Close MSIV's & Normally Closed MSL Drain PCIV's/DPS Initiation of MSIV Closure/Manual Closure of MSIV's and Inboard Main Steam Line Drain PCIV from DPS
TABLE 3.3.1-1	24. Condenser Vacuum - Low	Loss of Condenser Vacuum (UFSAR Section 15.2.5)	AOO	Manually Close MSIV's & Normally Closed MSL Drain PCIV's / DPS Initiation of MSIV Closure/Manual Closure of MSIV's and Inboard Main Steam Line Drain PCIV from DPS
TABLE 3.3.1-1	25. Outboard MSIV Room Temperature - High	MSLB Outside Primary Containment (UFSAR Section 15.6.4)	DBA	Function 23 / Manually Close MSIV's & Normally Closed MSL Drain PCIV's / DPS Initiation of MSIV Closure/Manual Closure of MSIV's and Inboard Main Steam Line Drain PCIV from DPS
TABLE 3.3.1-1	26. RWCS Δ Flow - High	RWCU Pipe Break (UFSAR Section 3.6.1 and Table 3.6-1)	HELB	Functions 4b, 27, 28 / Manually Close RWCU PCIV's/Manual RWCU PCIV's Closure from DPS
TABLE 3.3.1-1	27. RWCS Area Temperature - High	RWCU Pipe Break (UFSAR Section 3.6.1 and Table 3.6-1)	HELB	Functions 4b, 26, 28 / Manually Close RWCU PCIV's/Manual RWCU PCIV's Closure from DPS
TABLE 3.3.1-1	28. RWCS Area Ventilation Δ Temperature - High	RWCU Pipe Break (UFSAR Section 3.6.1 and Table 3.6-1)	HELB	Functions 4b, 26, 27 / Manually Close RWCU PCIV's/Manual RWCU PCIV's Closure from DPS

Limerick PPS Instrumentation TS Table 3.3.1-1 Diversity

TABLE 3.3.1-1	29. SLCS Initiation	Isolate RWCU During RRCS SLCS Initiation (UFSAR Sections 9.3.5 & 15.8)	ATWS	Manually Close RWCU PCIV's foe SCLS Initiation/Manual RWCU PCIV's Closure from DPS
TABLE 3.3.1-1	30. RCIC Steam Line Δ Pressure - High	RCIC Pipe Break (UFSAR Section 3.6.1 and Table 3.6-1)	HELB	Functions 3e, 32, 33, 34 / Manually Close RCIC PCIV's/Manual Inboard RCIC Steam Admission PCIV Closure from DPS
TABLE 3.3.1-1	31. RCIC Turbine Exhaust Diaphragm Pressure - High	Isolates RCIC for Leakage and Equipment Protection (UFSAR Section 7.3.1.1.2.4.13)	None	Functions 3e, 32, 33, 34 / Manually Close RCIC PCIV's/Manual Inboard RCIC Steam Admission PCIV Closure from DPS
TABLE 3.3.1-1	32. RCIC Equipment Room Temperature - High	RCIC Pipe Break (UFSAR Section 3.6.1 and Table 3.6-1)	HELB	Functions 3e, 30, 33, 34 / Manually Close RCIC PCIV's/Manual Inboard RCIC Steam Admission PCIV Closure from DPS
TABLE 3.3.1-1	33. RCIC Equipment Room Δ Temperature - High	RCIC Pipe Break (UFSAR Section 3.6.1 and Table 3.6-1)	HELB	Functions 3e, 30, 32, 34 / Manually Close RCIC PCIV's/Manual Inboard RCIC Steam Admission PCIV Closure from DPS
TABLE 3.3.1-1	34. RCIC Pipe Routing Area Temperature - High	RCIC Pipe Break (UFSAR Section 3.6.1 and Table 3.6-1)	HELB	Functions 3e, 30, 32, 33 / Manually Close RCIC PCIV's/Manual Inboard RCIC Steam Admission PCIV Closure from DPS

Limerick PPS Instrumentation TS Table 3.3.1-1 Diversity

Initiating Events:		Credited PPS (RPS) Automatic Instrumentation:							Diverse PPS (RPS) Automatic or Manual Instrumentation:						
UFSAR Section	Transient and/or Accident	RPV High Pressure	RPV Low Water Level (L3)	APRM High Neutron Flux	TSV Closure Limit Switch	TCV Fast Closure Pressure Switch	MSIV Closure Limit Switch	Drywell High Pressure	RPV High Pressure	RPV Low Water Level (L3)	APRM High Neutron Flux	TSV Closure LS	TCV Fast Closure PS	MSIV Closure LS	Manual SCRAM
	Decrease in Reactor Coolant Temperature:														
15.1.2	Feedwater Max Demand Controller Failure				X				X		X		X		X
15.1.3	Pressure Regulator Fails Open				X				X				X	X	X
	Increase in Reactor Vessel Pressure:														
15.2.2	Generator Trip or Load Rejection					X			X		X	X			X
15.2.3	Turbine Trip				X				X		X		X		X
15.2.4	MSIV Closure						X		X		X				X
15.2.5	Loss of Condenser Vacuum				X				X		X		X	X	X
15.2.6	Loss of AC Power (LOOP)					X			X		X	X			X
15.2.7	Loss of All Feedwater Flow		X												X
15.2.9	Failure of RHR Shutdown Cooling					X			X		X	X			X
15.2.10	Loss of Stator Cooling	X									X				X
	Decrease in Reactor Coolant System Flow Rate:														
15.3.1	Both Recirculation Pumps Trip				X				X				X		X
	Reactivity and Power Distribution Anomalies:														
15.4.4	Abnormal Startup of Idle Recirculation Pump			X											X
15.4.5	Recirculation Flow Control Failure - Increasing Flow			X											X
	Decrease In Reactor Coolant Inventory:														
15.6.4	MSLB Outside Primary Containment						X			X					X
15.6.5	LOCA		X					X						X	X
15.6.6	FWLB Outside Primary Containment		X												X

Limerick PPS Instrumentation TS Table 3.3.1-1 Diversity

ADDITIONAL LIMERICK UFSAR REFERENCES:

UFSAR Section	Reactor Protection System
7.2.2	Reactor Protection System (RPS)

UFSAR Section	Core Spray/LPCI UFSAR Event Section Description
6.3	Emergency Core Cooling Systems
7.6.1.2	High Pressure/Low Pressure Systems Interlocks
15.2.9	Failure of RHR Shutdown Cooling (Credits No Automatic Action)
15.6.4	MSLB Outside Primary Containment
15.6.5	LOCA
15.6.6	FWLB Outside Primary Containment

UFSAR Section	HPCI UFSAR Event Section Description
6.3	Emergency Core Cooling Systems
15.1.2	Feedwater Max Demand Controller Failure
15.1.3	Pressure Regulator Fails Open
15.2.4	MSIV Closure
15.2.5	Loss of Condenser Vacuum
15.2.6	Loss of AC Power (LOOP)
15.2.7	Loss of All Feedwater Flow
15.3.1	Both Recirculation Pumps Trip
15.6.4	MSLB Outside Primary Containment
15.6.5	LOCA
15.6.6	FWLB Outside Primary Containment

UFSAR Section	ADS UFSAR Event Section Description
6.3	Emergency Core Cooling Systems
15.6.4	MSLB Outside Primary Containment
15.6.5	LOCA

UFSAR Section	RCIC UFSAR Event Section Description
5.4.6	Reactor Core Isolation Cooling System
15.1.2	Feedwater Max Demand Controller Failure
15.1.3	Pressure Regulator Fails Open
15.2.4	MSIV Closure
15.2.5	Loss of Condenser Vacuum
15.2.6	Loss of AC Power (LOOP)
15.2.7	Loss of All Feedwater Flow
15.3.1	Both Recirculation Pumps Trip
15.6.4	MSLB Outside Primary Containment
15.6.5	LOCA
15.6.6	FWLB Outside Primary Containment

Limerick PPS Instrumentation TS Table 3.3.1-1 Diversity

		Credited Automatic Function:																			
Event		LOCA	LOCA	LOCA	MSLB	MSLB	LOCA	LOCA	HELB	HELB	LOCA	HELB	LOCA	LOCA	AOO	AOO	FHA	LOCA	ISLOCA	LOCA	ATWS
Trip Signal Letter		A	B	C	E	F	G	H	J	K	KA	L	LA	M	P	Q	R	S	V	W	Y
PPS (NSSSS) Group	Function	RPV Low Water Level (L3)	RPV Low Water Level (L2)	RPV Low Water Level (L1)	MSL High Flow	MSL High Area Temp	ECCS Isolation (C&H)	Drywell High Pressure	RWCU Line Break	RCIC Line Break	RCIC Low Steam Pressure	HPCI Line Break	HPCI Low Steam Pressure	ADS Instr Gas Isolation	MSIV Low MSL Pressure	MSIV Low Condenser Vacuum	Refuel Area High Rad	Reactor Enclosure High Rad	RHR SDC High RPV Pressure	North Stack High Rad	RWCU SLC Isolation
ONE	***MAIN STEAM LINE ISOLATION: (RCPB Break/Leak, EHC Pressure Control Failure, Loss of the Primary Heat Sink (Main Condenser))***																				
IA	MSIV's			X	X	X									X	X					
	MSL Drain MOV's			X	X	X									X	X					
IB	MSL Sample AOV's		X																		
TWO	***RHR SDC MODE ISOLATION: (Isolates the RHR SDC Lines to Remove a Potential RPV Leakage Source and Protect the Low Pressure RHR Piping)***																				
IIA	SDC Suction and Injection MOV's/Injection Testable Check Valves & Their Bypass AOV's	X																	X		
IIA	RHR Discharge to Radwaste MOV's and RHR Sample AOV's	X						X													
THREE	***RWCU SYSTEM ISOLATION (RWCU System Leak Isolation and Isolate RWCU Upon a Standby Liquid Control (SLC) System Initiation Signal):***																				
III	RWCU Suction MOV's	X							X												X
FOUR	***HPCI SYSTEM ISOLATION (HPCI System Leak Isolation and Isolate HPCI System via PCIV's Due to Lack of Motive Steam Pressure to Effectively Function):***																				
IV	HPCI Steam Line MOV's											X	X								
FIVE	***RCIC SYSTEM ISOLATION (RCIC System Leak Isolation and Isolate RCIC System via PCIV's Due to Lack of Motive Steam Pressure to Effectively Function):***																				
V	RCIC Steam Line MOV's									K	X										

Limerick PPS Instrumentation TS Table 3.3.1-1 Diversity

		Credited Automatic Function:																			
	Event	LOCA	LOCA	LOCA	MSLB	MSLB	LOCA	LOCA	HELB	HELB	LOCA	HELB	LOCA	LOCA	AOO	AOO	FHA	LOCA	ISLOCA	LOCA	ATWS
	Trip Signal Letter	A	B	C	E	F	G	H	J	K	KA	L	LA	M	P	Q	R	S	V	W	Y
PPS (NSSSS) Group	Function	RPV Low Water Level (L3)	RPV Low Water Level (L2)	RPV Low Water Level (L1)	MSL High Flow	MSL High Area Temp	ECCS Isolation (C&H)	Drywell High Pressure	RWCU Line Break	RCIC Line Break	RCIC Low Steam Pressure	HPCI Line Break	HPCI Low Steam Pressure	ADS Instr Gas Isolation	MSIV Low MSL Pressure	MSIV Low Condenser Vacuum	Refuel Area High Rad	Reactor Enclosure High Rad	RHR SDC High RPV Pressure	North Stack High Rad	RWCU SLC Isolation
SIX	***PRIMARY CONTAINMENT PURGE/N2 INERTING SYSTEMS/RAD MONITORING/CONTAINMENT SAMPLING (Isolate a Primary/Secondary Containment Leakage Path to the Environment):***																				
VIA	Drywell & Suppression Pool Air Purge/Drywell & Suppression Pool Nitrogen Purge/Drywell & Suppression Pool Purge to SGTS (11 Valves Total)		X					X									X	X		X	
VIB	Drywell & Suppression Pool Purge to Equipment Compartment/Nitrogen Inerting Block Valves (6 Valves Total)		X					X									X	X			
VIC	Drywell/Suppression Pool Sampling/Drywell Rad Monitoring/Small Nitrogen Makeup/H2 Recombiner Valves (29 Valves Total)		X					X									X	X			
SEVEN	***PRIMARY CONTAINMENT INSTRUMENT GAS (Isolates A Potential Primary Containment LOCA Leakage Path):***																				
VIIA	Primary Containment Instrument Gas Line (5 Valves Total)			X				X										X			
VIIB	TIP Purge Tube (1 Valve)		X					X										X			
VIIC	ADS Valves Instrument Gas													X							
EIGHT	***DW CHILLED WATER/REACTOR ENCLOSURE COOLING WATER/DRYWELL EQUIPMENT/FLOOR DRAIN SYSTEM/TIP RETRACTION/SP CLEANUP (Isolates Potential Primary Containment LOCA Leakage Path):***																				
VIIIA	DWCW and RECW Isolation Valves (12 Valves Total)			X				X													
VIIIB	Drywell Equipment and Floor Drain Valves/TIP Guide Tubes/Suppression Pool Cleanup (11 Valves Total)		X					X													

Limerick PPS Instrumentation TS Table 3.3.1-1 Diversity

TS Table	ATWS-RPT Instrumentation Function	Credited Safety Analysis Event	Event	Diverse PPS/DCS Instrumentation
TABLE 3.3.4.1-1	1. Reactor Vessel Water Level - Wide Range, Low-Low Level 2	RRCS Trips Both Recirculation Pumps (UFSAR Sections 7.6 and 15.8, Table 7.6-5)	ATWS	Function 2 / Manually Trip Both Recirculation Pumps by MCR Handswitch via EOC Trip Coils / Manually Trip Both Recirculation Pumps by RRCS MCR Manual Initiation
TABLE 3.3.4.1-1	2. Reactor Vessel Steam Dome Pressure - High	RRCS Trips Both Recirculation Pumps (UFSAR Sections 7.6 and 15.8, Table 7.6-5)	ATWS	Function 1 / Manually Trip Both Recirculation Pumps by MCR Handswitch via EOC Trip Coils / Manually Trip Both Recirculation Pumps by RRCS MCR Manual Initiation

TS	End-Of-Cycle Recirculation Pump Trip Instrumentation Function	Credited Safety Analysis Event	Event	Diverse PPS/DCS Instrumentation
3.3.4.2	Turbine Stop Valve - Closure Turbine Control Valve - Fast Closure	Reduces Severity of UFSAR Chapter 15 Reactor Fast Pressurization Transient Events on Nuclear Fuel Cladding Integrity (Fuel Thermal Margin MCPR). Supplements the Reactor Scram Function During These Events.	AOO	Manually Trip Both Recirculation Pumps by MCR Handswitch via EOC Trip Coils / Apply MCPR Penalty Per the COLR. This is an Approved Compensatory Measure When the End-Of-Cycle Recirculation Pump Trip (EOC-RPT_ System is Inoperative (OOS).

LIMERICK UFSAR REFERENCES:

UFSAR Section	End-Of-Cycle Recirculation Pump Trip UFSAR Event Section Description
7.7.1.3	Recirculation Flow Control System
15.1.2	Feedwater Max Demand Controller Failure
15.1.3	Pressure Regulator Fails Open
15.2.2	Generator Trip or Load Rejection
15.2.3	Turbine Trip
15.2.5	Loss of Condenser Vacuum
15.2.6	Loss of AC Power (LOOP)
15.2.7	Loss of All Feedwater Flow
15.2.9	Failure of RHR Shutdown Cooling

ENCLOSURE 1

License Amendment Request

Limerick Generating Station, Units 1 and 2
Docket Nos. 50-352 and 50-353

License Amendment Request to Reinstate and Apply
Risk-Informed Completion Time (RICT) Applications

List of Revised Required Actions to Corresponding PRA Functions

1. Introduction

Section 4.0, Item 2 of the Nuclear Regulatory Commission's (NRC) Final Safety Evaluation [1] for NEI 06-09, Revision 0-A, Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines [2] identifies the following needed content when submitting a license amendment request to adopt Technical Specification (TS) Risk-Informed Completion Times (RICT):

- The License Amendment Request (LAR) will provide identification of the TS Limiting Conditions for Operation (LCOs) and action requirements to which the RMTS will apply.

- The LAR will provide a comparison of the TS functions to the probabilistic risk analysis (PRA) modeled functions of the Structures, Systems, and Components (SSCs) subject to those LCO actions.

- The comparison should justify that the scope of the PRA model, including applicable success criteria such as number of SSCs required, flow rate, etc., are consistent with licensing basis assumptions (i.e., Title 10 of the *Code of Federal Regulations* (10 CFR) 50.46 emergency core cooling system (ECCS) flowrates) for each of the TS requirements, or an appropriate disposition or programmatic restriction will be provided.

2. Revised Required Actions to Corresponding PRA Functions

This enclosure provides confirmation that the Limerick Generating Station (LGS) PRA models include the necessary scope of SSCs and their functions to address each proposed application of the RICT Program to the proposed scope TS LCO Conditions, and provides the information requested for Section 4.0, Item 2 of the NRC Final Safety Evaluation. The scope of the comparison includes each of the TS LCO conditions and associated required actions within the scope of the RICT Program. The LGS PRA model has the capability to model directly or through use of a bounding surrogate, the risk impact of entering each of the TS LCOs in the scope of the RICT Program.

Table E1-1 below lists each TS LCO Condition to which the RICT Program is proposed to be applied and documents the following information regarding the TSs with the associated safety analyses, the analogous PRA functions, and the results of the comparison:

- Column “SSCs Covered by TS LCO Condition”: The SSCs addressed by each action requirement for the associated TS.

- Column “SSCs Modeled in PRA”: Indicates whether the SSCs addressed by the TS LCO Condition are explicitly modeled in the PRA.

- Column “Function Covered by TS LCO Condition”: A summary of the required functions from the design basis analyses.

- Column “Design Success Criteria”: A summary of the success criteria from the design basis analyses.

- Column “PRA Success Criteria”: The function success criteria modeled in the PRA.

- Column “Other Comments”: Provides the justification or resolution to address any inconsistencies between the TS and PRA functions regarding the scope of SSCs and the success criteria. Where the PRA scope of SSCs is not consistent with the TS, additional information is provided to describe how the LCO Condition can be evaluated using appropriate surrogate events. Differences in the success criteria for TS functions are addressed to demonstrate the PRA criteria provide a realistic estimate of the risk of the TS Condition as required by NEI 06-09-A.

The corresponding SSCs for each TS LCO and the associated TS functions are identified and compared to the PRA. This description also includes the design success criteria and the applicable PRA success criteria. Any differences between the scope or success criteria are described in the table. Scope differences are justified by identifying appropriate surrogate events which permit a risk evaluation to be completed using the Configuration Risk Management Program (CRMP) tool, otherwise referred to as the Real-Time Risk (RTR) tool for the RICT program. Differences in success criteria typically arise due to the requirement in the PRA standard to make PRAs realistic rather than bounding, whereas design basis criteria are necessarily conservative and bounding. The use of realistic success criteria is necessary to accurately model the as-built as-operated plant, and to conform to capability Category II of the PRA standard [3] (as required by NEI 06-09, Revision 0-A).

Examples of calculated RICT are provided in Table E1-2 for each individual condition to which the RICT applies (assuming no other SSCs modeled in the PRA are unavailable). These example calculations demonstrate the scope of the SSCs covered by technical specifications modeled in the PRA. Note that the more limiting of the core damage frequency (CDF) and large early release frequency (LERF) RICT result is shown.

Following Initiative 4b implementation, the actual RICT values will be calculated using the actual plant configuration and the current revision of the PRA model representing the as-built, as-operated condition of the plant, as required by NEI 06-09 and the NRC safety evaluation and may differ from the RICTs presented.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
TS 3.3.1 – Reactor Protection System (RPS) Instrumentation **Condition 3.3.1.a (one or more Functions less than the Minimum OPERABLE Channels required by Table 3.3.1-1)** **Condition 3.3.1.b (two or more Functions less than the Minimum OPERABLE Channels required by Table 3.3.1-1)** ***See Note 1 at the end of this table***					
Intermediate Range Monitors – Function 1.a (Neutron Flux–High) 8 Channels	Not Explicitly	Provide reactor scram initiation signal based on plant monitored parameters	1-of-2 logic in each of two trip divisions	N/A	Failure of APRMs will be used as a conservative surrogate.
Intermediate Range Monitors – Function 1.b (Inoperative) 8 Channels	Not Explicitly	Provide reactor scram initiation signal based on plant monitored parameters	1-of-2 logic in each of two trip divisions	N/A	Failure of APRMs will be used as a conservative surrogate.
Average Power Range Monitors – Function 2.a. (Neutron Flux – Upscale (Setdown)) 4 channels, 4 Voters devices (LCL 1 through 4)	Yes	Provide reactor scram initiation signal based on plant monitored parameters	2-of-4 APRMs	1-of-2 logic in each of two trip divisions	SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program. The success criteria are consistent with the design basis. ***See Note 2***.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Average Power Range Monitors – Function 2.b.i (Simulated Thermal Power – Upscale, Two Recirculation Loop Operation), 4 Channels	Yes	Provide reactor scram initiation signal based on plant monitored parameters	2-of-4 APRMs	1-of-2 logic in each of two trip divisions	SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program. The success criteria are consistent with the design basis. ***See Note 2***.
Average Power Range Monitors – Function 2.b.ii (Simulated Thermal Power – Upscale, Single Recirculation Loop Operation), 4 Channels	Yes	Provide reactor scram initiation signal based on plant monitored parameters	2-of-4 APRMs	1-of-2 logic in each of two trip divisions	SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program. The success criteria are consistent with the design basis. ***See Note 2***.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Average Power Range Monitors – Function 2.c (Neutron Flux – Upscale), 4 Channels	Yes	Provide reactor scram initiation signal based on plant monitored parameters	2-of-4 APRMs	1-of-2 logic in each of two trip divisions	SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program. The success criteria are consistent with the design basis. ***See Note 2.***
Average Power Range Monitors – Function 2.d (Neutron Flux – Inoperative), 4 Channels	Yes	Provide reactor scram initiation signal based on plant monitored parameters	2-of-4 APRMs	1-of-2 logic in each of two trip divisions	SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program. The success criteria are consistent with the design basis. ***See Note 2.***

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Average Power Range Monitors – Function 2.e (2-Out-of-4 Voter), 4 Channels	Yes	Provide reactor scram initiation signal based on plant monitored parameters	1-of-2 logic in each of two voter groups (Voters 1 and 3; Voters 2 and 4)	Same as design.	SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program. The success criteria are consistent with the design basis. ***See Note 2.***
Average Power Range Monitors – Function 2.f (OPRM Upscale), 4 Channels	Yes	Provide reactor scram initiation signal based on plant monitored parameters	2-of-4 OPRMs	1-of-2 logic in each of two trip divisions	SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program. The success criteria are consistent with the design basis. ***See Note 2.***

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Reactor Vessel Pressure – Function 3.a (Reactor Vessel Steam Dome Pressure – High), 4 Channels	Yes	Provide reactor scram initiation signal based on plant monitored parameters	2-of-4 Reactor Steam Dome Pressure - High instruments	Same as design	SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program. The success criteria are consistent with the design basis.
Reactor Vessel Pressure – Function 3.b (Reactor Vessel Pressure – High [RHR-SDC Cut-In]), 4 Channels	Not Explicitly	Provide RHR Shutdown Cooling cut-in permissive signal	2-of-4 Reactor Steam Dome Pressure – High instruments	N/A	The failure of HV-051-1(2)F008(9) and HV-051-1(2)F015A(B) are used as surrogates. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Reactor Vessel Pressure – Function 3.c.1 (Reactor Vessel Pressure – Low, LOCA Permissive), 4 Channels	Yes	Provide partial ECCS actuation signal and provide isolation signal for ECCS Process Lines and Instrument Gas Block & Vents	2-of-4 Reactor Vessel Pressure – Low instruments (*Permissive*)	Same as Design	SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program. The success criteria are consistent with the design basis.
Reactor Vessel Pressure – Function 3.d (HPCI Steam Supply Pressure – Low), 4 Channels	Not Explicitly	Provide HPCI isolation signal	2-of-4 HPCI Steam Supply Pressure – Low instruments	N/A	The failure of HV-055-1F002 and HV-055-1F003 are used as surrogates. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Reactor Vessel Pressure – Function 3.e (RCIC Steam Supply Pressure – Low), 4 Channels	Not Explicitly	Provide RCIC isolation signal	2-of-4 RCIC Steam Supply Pressure – Low instruments	N/A	The failure of HV-049-1F007 and HV-049-1F008 are used as surrogates. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Reactor Vessel Water Level – Wide Range – Function 4.a (Low, Low, Low Level 1), 4 Channels	Yes	Provide ECCS actuation signal and containment isolation functions. ***See Note 3.***	2-of-4 Reactor Vessel Water Level – Wide Range, Level 1 instruments	Same as Design	MSIV failure to close events are additionally used as surrogates for the MSIV closure function. SSCs are modeled consistent with the TS scope and so can be directly included in the RTR tool for the RICT program. The success criteria are consistent with the design basis.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Reactor Vessel Water Level – Wide Range – Function 4.b (Low, Low – Level 2), 4 Channels	Yes	Provide HPCI and RCIC initiation signals and containment isolation functions. ***See Note 4.***	2-of-4 Reactor Vessel Water Level – Wide Range, Level 2 instruments	Same as Design	SSCs are modeled consistent with the TS scope and so can be directly included in the RTR tool for the RICT program. The success criteria are consistent with the design basis. HV-044-1F001 and HV-044-1F004 failure to close are also used as surrogates for the RWCU isolation function.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Reactor Vessel Water Level – Narrow Range – Function 5.a (Low – Level 3), 4 Channels	Not Explicitly	Provide reactor scram initiation signal based on plant-monitored parameters and confirm ADS Trip function actuation. Associated isolation signals include those for RHR SDC and RHR HX Sample Lines	2-of-4 Reactor Vessel Water Level – Narrow Range (Level 3) instruments	Same as Design	The failure of HV-051-1(2)F008(9) and HV-051-1(2)F015A(B) are used as surrogates in addition to the level instruments. SSCs are modeled consistent with the TS scope and so can be directly included in the RTR tool for the RICT program.
Reactor Trip System – Function 6.a (Scram Discharge Volume Water Level – High Level Transmitter), 4 level transmitters	Not Explicitly	Provide reactor scram initiation signal based on plant monitored parameters	2-of-4 Scram Discharge Volume Water Level – High Level Transmitter instruments	N/A	Scram TU events will be used as a conservative surrogate. SSCs are modeled consistent with the TS scope and so can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Reactor Trip System – Function 6.b (Scram Discharge Volume Water Level – High Float Switch), 4 switches	Not Explicitly	Provide reactor scram initiation signal based on plant monitored parameters	2-of-4 Scram Discharge Volume Water Level – High Float Switch instruments	N/A	Scram TU events will be used as a conservative surrogate. SSCs are modeled consistent with the TS scope and so can be directly included in the RTR tool for the RICT program.
Reactor Trip System – Function 7 (Reactor Mode Switch Position), 4 Channels	Not Explicitly	Provide reactor scram initiation signal	2-of-4 Reactor Mode Switch contacts	N/A	Scram pushbutton failure is modeled as a conservative surrogate. SSCs are modeled consistent with the TS scope and so can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Drywell Function 8 – Drywell Pressure – High, 4 Channels	Yes	Initiate reactor scram, HPCI, and partial ECCS actuation, and provide associated containment isolation functions. ***See Note 5.***	2-of-4 Drywell Pressure - High instruments	Same as Design	SSCs are modeled consistent with the TS scope and so can be directly included in the RTR tool for the RICT program.
Drywell Function 9 – Primary Containment Instrument Gas Line to Drywell Δ Pressure – Low, 2 Channels	Not Explicitly	Provide long-term N_2 backup to ADS isolation	1-of-1 Primary Containment Instrument Gas Line to Drywell Δ Pressure – Low instrument per valve	N/A	A conservative generic isolation failure basic event is used as a surrogate. SSCs are modeled consistent with the TS scope and so can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Emergency Core Cooling System – Function 10 (Condensate Storage Tank Level – Low), 4 Channels	Yes	Initiate HPCI and RCIC automatic suction transfer to suppression pool	2-of-4 Condensate Storage Tank Level – Low instruments	Same as design	SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program. The success criteria are consistent with the design basis.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
High Pressure Coolant Injection (HPCI) – Function 13 (Suppression Pool Water Level – High), 2 Channels	Not Explicitly	Initiate HPCI automatic suction transfer to suppression pool	1-of-2 Suppression Pool Water Level – High instruments	N/A	The specific suppression pool level transmitters (e.g., LT-055-*N062B/F) are not modeled individually in the PRA. The condensate storage tank (CST) level is used as a surrogate for HPCI suction transfer logic. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
High Pressure Coolant Injection (HPCI) – Function 14 (HPCI Steam Line Δ Pressure – High), 2 Channels	Not Explicitly	HPCI Isolation	1-of-2 HPCI Steam Line Δ Pressure – High instruments	N/A	The frequency of identified HPCI isolation valve surrogates are conservatively increased to reflect potential Break Outside Containment (BOC) impacts on isolation instrumentation. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
High Pressure Coolant Injection (HPCI) – Function 15 (HPCI Turbine Exhaust Diaphragm Pressure – High), 4 Channels	Not Explicitly	HPCI Isolation	2-of-4 HPCI Turbine Exhaust Diaphragm Pressure – High instruments	N/A	The frequency of identified HPCI isolation valve surrogates are conservatively increased to reflect potential Break Outside Containment (BOC) impacts on isolation instrumentation. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
High Pressure Coolant Injection (HPCI) – Function 16 (HPCI Equipment Room Temperature – High), 2 Channels	Not Explicitly	HPCI Isolation	1-of-2 HPCI Equipment Room Temperature – High instruments	N/A	The frequency of identified HPCI isolation valve surrogates are conservatively increased to reflect potential Break Outside Containment (BOC) impacts on isolation instrumentation. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
High Pressure Coolant Injection (HPCI) – Function 17 (HPCI Equipment Room Δ Temperature – High), 2 Channels	Not Explicitly	HPCI Isolation	1-of-2 HPCI Equipment Room Δ Temperature – High instruments	N/A	The frequency of identified HPCI isolation valve surrogates are conservatively increased to reflect potential Break Outside Containment (BOC) impacts on isolation instrumentation. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
High Pressure Coolant Injection (HPCI) – Function 18 (HPCI Pipe Routing Area Temperature – High), 8 Channels	Not Explicitly	HPCI Isolation	1-of-8 HPCI Pipe Routing Area Temperature – High instruments	N/A	The frequency of identified HPCI isolation valve surrogates are conservatively increased to reflect potential Break Outside Containment (BOC) impacts on isolation instrumentation. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.
Main Steam, Turbine, Condenser – Function 19 (Main Steam Line Isolation Valve – Closure), 4 Channels	Yes	Provide reactor scram initiation signal based on plant monitored parameters	2-of-4 Main Steam Lines – Closure instrument loops	Same as design	SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program. The success criteria are consistent with the design basis.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Main Steam, Turbine, Condenser – Function 20 (Turbine Stop Valve – Closure), 4 Channels	Yes	Provide reactor scram initiation signal based on plant monitored parameters	2-of-4 Turbine Stop Valve – Closure instrument loops	Same as design	SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program. The success criteria are consistent with the design basis.
Main Steam, Turbine, Condenser – Function 21 (Turbine Control Valve Fast Closure, Trip Oil Pressure – Low), 4 Channels	Yes	Provide reactor scram initiation signal based on plant monitored parameters	2-of-4 Turbine Control Valve Fast Closure, Trip Oil Pressure – Low instruments	Same as design	SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program. The success criteria are consistent with the design basis.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Main Steam, Turbine, Condenser – Function 22 (Main Steam Line Pressure – Low), 4 Channels	Not Explicitly	Provide MSIV Isolation signal	2-of-4 Main Steam Line Pressure – Low instruments	N/A	Main Steam Isolation Valves (MSIVs) failing to close are used as a surrogate in the PRA model. A conservative BOC identified-event frequency is applied. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Main Steam, Turbine, Condenser – Function 23 (Main Steam Line Flow – High), 4 Channels per Steam Line	Not Explicitly	Provide MSIV Isolation signal	2-of-4 per Main Steam Line	N/A	Main Steam Isolation Valves (MSIVs) failing to close are used as a surrogate in the PRA model. A conservative BOC identified-event frequency is applied. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Main Steam, Turbine, Condenser Function 24 Condenser Vacuum – Low 4 Channels	Not Explicitly	Provide MSIV Isolation signal	2-of-4 Main Condenser Vacuum - Low instruments	N/A	Main Steam Isolation Valves (MSIVs) failing to close are used as a surrogate in the PRA model. A conservative BOC identified-event frequency is applied. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Main Steam, Turbine, Condenser Function 25 Outboard MSIV Room Temperature – High 4 Channels	Not Explicitly	Provide MSIV Isolation signal	2-of-4 Outboard MSIV Room Temperature - High instruments	N/A	Main Steam Isolation Valves (MSIVs) failing to close are used as a surrogate in the PRA model. A conservative BOC identified-event frequency is applied. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Reactor Water Cleanup System and Standby Liquid Control – Function 26 (RWCS Δ Flow – High), 2 Channels	Not Explicitly	RWCU Isolation	1-of-2 RWCS Δ Flow – High sensor channels	N/A	RWCU (Reactor Water Cleanup) isolation valves failing to close are used as a surrogate in the PRA model. A conservative BOC identified-event frequency is applied. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Reactor Water Cleanup System and Standby Liquid Control – Function 27 (RWCS Area Temperature – High), 12 Channels	Not Explicitly	RWCU Isolation	1-of-12 RWCS Area Temperature – High instruments	N/A	RWCU (Reactor Water Cleanup) isolation valves failing to close are used as a surrogate in the PRA model. A conservative BOC identified-event frequency is applied. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Reactor Water Cleanup System and Standby Liquid Control – Function 28 (RWCS Area Ventilation Δ Temperature – High), 12 Channels	Not Explicitly	RWCU Isolation	1-of-12 RWCS Area Ventilation Δ Temperature – High instruments	N/A	RWCU (Reactor Water Cleanup) isolation valves failing to close are used as a surrogate in the PRA model. A conservative BOC identified-event frequency is applied. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Reactor Water Cleanup System and Standby Liquid Control – Function 29 (SLCS Initiation), 3 Channels	Not Explicitly	RWCU Isolation	1-of-3 SLC Pump running feedback signals	N/A	A common cause event for RWCU (Reactor Water Cleanup) isolation valves failing to close are used as a surrogate in the PRA model. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Reactor Core Isolation Cooling (RCIC) – Function 30 (RCIC Steam Line Δ Pressure – High), 2 Channels	Not Explicitly	RCIC Isolation	1-of-2 RCIC Steam Line Δ Pressure – High instruments	N/A	RCIC isolation valves failing to close are used as a surrogate in the PRA model. A conservative BOC identified-event frequency is applied. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Reactor Core Isolation Cooling (RCIC) – Function 31 (RCIC Turbine Exhaust Diaphragm Pressure – High), 4 Channels	Not Explicitly	RCIC Isolation	2-of-4 RCIC Turbine Exhaust Diaphragm Pressure – High instruments	N/A	RCIC isolation valves failing to close are used as a surrogate in the PRA model. A conservative BOC identified-event frequency is applied. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Reactor Core Isolation Cooling (RCIC) – Function 32 (RCIC Equipment Room Temperature – High), 2 Channels	Not Explicitly	RCIC Isolation	1-of-2 RCIC Equipment Room Temperature – High instruments	N/A	RCIC isolation valves failing to close are used as a surrogate in the PRA model. A conservative BOC identified-event frequency is applied. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Reactor Core Isolation Cooling (RCIC) – Function 33 (RCIC Equipment Room Δ Temperature – High), 2 Channels	Not Explicitly	RCIC Isolation	1-of-2 RCIC Equipment Room Δ Temperature – High instruments	N/A	RCIC isolation valves failing to close are used as a surrogate in the PRA model. A conservative BOC identified-event frequency is applied. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Reactor Core Isolation Cooling (RCIC) – Function 34 (RCIC Pipe Routing Area Temperature – High), 10 Channels	Not Explicitly	RCIC Isolation	1-of-10 RCIC Pipe Routing Area Temperature – High instruments	N/A	RCIC isolation valves failing to close are used as a surrogate in the PRA model. A conservative BOC identified-event frequency is applied. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.
TS 3.3.2 – Plant Protection System (PPS) Instrumentation **Condition 3.3.2.a.1 (one or more reactor trip divisions inoperable)**					
Plant Protection System (PPS) – 4 Divisions	Yes	Provide reactor scram initiation signal based on plant-monitored parameters	PPS Reactor trip divisions 1 or 3 trip scram bus A. PPS Reactor trip divisions 2 or 4 trip scram bus B.	Same as design	SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
TS 3.3.4 – Recirculation Pump Trip Actuation Instrumentation TS 3.3.4.1 –ATWS Recirculation Pump Trip System Instrumentation Condition 3.3.4.1.a (the number of OPERABLE channels one less than required by the Minimum OPERABLE Channels required by Table 3.3.4.1-1) Condition 3.3.4.1.b (the number of OPERABLE channels two or more less than the Minimum OPERABLE Channels required by Table 3.3.4.1-1) Condition 3.3.4.1.c (one subsystem inoperable)					
Anticipated Transient Without Scram Recirculation Pump Trip (ATWS-RPT) System Instrumentation – Function 1 (Reactor Vessel Water Level – Wide Range, Low Low Level 2), 4 Channels	Yes	Provide recirculation pump trip initiation	2-of-4 Reactor Vessel Water Level – Wide Range (Level 2) instruments	Same as design	SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Anticipated Transient Without Scram Recirculation Pump Trip (ATWS-RPT) System Instrumentation – Function 2 (Reactor Vessel Steam Dome Pressure – High), 4 Channels	Yes	Provide recirculation pump trip initiation	2-of-4 Reactor Steam Dome Pressure – High instruments	Same as design	SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.
Two ATWS Recirculation Pump Trip System Instrumentation Subsystems	Yes	Rapidly Reduce Reactor Power via Reactor Recirculation Pump trip	1-of-2 ATWS Recirculation Pump Trip System Instrumentation Subsystems	N/A	RPT breakers are used as a surrogate in the PRA model. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
TS 3.3.4.2 – End of Cycle Recirculation Pump Trip System Instrumentation **Condition 3.3.4.2.a (one subsystem inoperable)**					
Two End-of-Cycle Recirculation Pump Trip (EOC-RPT) subsystems	Yes	Minimize reactor pressure increase by reduction in core flow after reactor trip	1-of-2 End-of-Cycle Recirculation Pump Trip subsystems	N/A	RPT breakers are used as a surrogate in the PRA model. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
TS 3.5.1 – Emergency Core Cooling Systems (ECCS Operating) **Condition 3.5.1.d.3.a (one subsystem inoperable, provided HPCI AND RCIC OPERABLE)** **Condition 3.5.1.d.3.b (one subsystem inoperable, HPCI OR RCIC INOPERABLE)**					
Automatic Depressurization System (ADS) – two subsystems controlling five ADS valves (HPCI and RCIC OPERABLE)_	Yes	Depressurize reactor pressure vessel to allow low-pressure injection and containment heat removal systems to inject	1-of-2 ADS subsystems capable of actuating ADS valves	Same as design	ADS valves are modeled consistent with the ECCS success criteria and credited to support LPCI and CS injection following failure of high-pressure systems. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions

SSCs Covered by TS LCO Condition	SSCs Modeled in PRA?	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Other Comments
Automatic Depressurization System (ADS) – two subsystems controlling five ADS valves (HPCI or RCIC INOPERABLE)_	Yes	Depressurize reactor pressure vessel to allow low-pressure injection and containment heat removal systems to inject	1-of-2 ADS subsystems capable of actuating ADS valves	Same as design	ADS valves are modeled consistent with the ECCS success criteria and credited to support LPCI and CS injection following failure of high-pressure systems. SSCs are modeled consistent with the TS scope and can be directly included in the RTR tool for the RICT program.

Note 1:
For TS 3.3.1 Conditions, the loss of function depends not only on the number of inoperable channels, but also on the combination of inoperable channels within the trip systems. Therefore, a RICT will not be applied when a loss of function occurs.

Note 2:
For the Average Power Range Monitor (APRM) functions, the PRA represents the APRM voter trip logic output, rather than the individual voter devices. This approach captures the same functional reliability credited in the design and is consistent with the TS scope and RTR implementation for the RICT program.

Note 3:
Provides isolation signals for the following: (1) Main Steam Isolation Valves and Main Steam Line Drains, (2) PCIG compressor suction lines and drywell header supply lines, (3) the primary containment vacuum breaker supply line, (4) drywell chilled water and recirculation pump cooling water, (5) ECCS process lines, and (6) instrument gas block and vent valves.

Note 4:
Provide isolation signals for the following: (1) Main Steam and Reactor Water Sample lines, (2) RWCU lines, (3) Primary Containment Purge Supply and Exhaust, (4) Primary Containment Exhaust to REECE and Nitrogen Block Valves, (5) Primary Containment Sampling and Recombiner lines, (6) PCIG TIP Purge Supply, (7) Drywell Equipment and Floor Drain Sump, (8) Suppression Pool Cleanup Pump Suction, (9) TIP Withdrawal, (10) Nitrogen Supply Vent valves, (11) Main Steam Line Drain Block valves, (12) Recirculation Pump Seal Purge Block valves, (13) Recirculation Pump Seal Purge Supply Vent valves, and (14) Reactor and Refueling Floor HVAC Trips.

Note 5:
Provide isolation signals for the following: (1) RHR heat exchanger sample lines and drain to radwaste, (2) HPCI, (3) RCIC, (4) Primary Containment Purge Supply and Exhaust, (5) Primary Containment Exhaust to REECE and Nitrogen Block Valves, (6) Primary Containment Sampling and Recombiner lines, (7) PCIG process lines, (8) PCIG TIP Purge Supply, (9) Drywell Chilled Water and Recirculation Pump Cooling Water, (10) Drywell Equipment and Floor Drain Sump, (11) Suppression Pool Cleanup Pump Suction, (12) TIP Withdrawal, (13) Nitrogen Supply Vent valves, (14) Main Steam Line Drain Block valves, (15) Recirculation Pump Seal Purge Block valves, (16) Instrument Gas Block and Vent valves, and (17) Reactor and Refueling Floor HVAC Trips.

Table E1-2: In-Scope TS/LCO Conditions RICT Estimate		
Technical Specification (TS)	**TS LCO condition**	**RICT Estimate Days[1]**
3.3.1 – Function 1.a	Intermediate Range Monitors – Function 1.a (Neutron Flux–High) 8 Channels	30
3.3.1 – Function 1.b	Intermediate Range Monitors – Function 1.b (Inoperative) 8 Channels	30
3.3.1 – Function 2.a.	Average Power Range Monitors – Function 2.a. (Neutron Flux – Upscale (Setdown)) 4 channels, 4 Voters devices (LCL 1 through 4)	30
3.3.1 – Function 2.b.i	Average Power Range Monitors – Function 2.b.i (Simulated Thermal Power – Upscale, Two Recirculation Loop Operation), 4 Channels	30
3.3.1 – Function 2.b.ii	Average Power Range Monitors – Function 2.b.ii (Simulated Thermal Power – Upscale, Single Recirculation Loop Operation), 4 Channels	30
3.3.1 – Function 2.c	Average Power Range Monitors – Function 2.c (Neutron Flux – Upscale), 4 Channels	30
3.3.1 – Function 2.d	Average Power Range Monitors – Function 2.d (Neutron Flux – Inoperative), 4 Channels	30
3.3.1 – Function 2.e	Average Power Range Monitors – Function 2.e (2-Out-of-4 Voter), 4 Channels	30
3.3.1 – Function 2.f	Average Power Range Monitors – Function 2.f (OPRM Upscale), 4 Channels	30
3.3.1 – Function 3.a	Reactor Vessel Pressure – Function 3.a (Reactor Vessel Steam Dome Pressure – High), 4 Channels	30
3.3.1 – Function 3.b	Reactor Vessel Pressure – Function 3.b (Reactor Vessel Pressure – High [RHR-SDC Cut-In]), 4 Channels	30
3.3.1 – Function 3.c.1	Reactor Vessel Pressure – Function 3.c.1 (Reactor Vessel Pressure – Low, LOCA Permissive), 4 Channels	30

Table E1-2: In-Scope TS/LCO Conditions RICT Estimate		
Technical Specification (TS)	**TS LCO condition**	**RICT Estimate Days[1]**
3.3.1 – Function 3.d	Reactor Vessel Pressure – Function 3.d (HPCI Steam Supply Pressure – Low), 4 Channels	30
3.3.1 – Function 3.e	Reactor Vessel Pressure – Function 3.e (RCIC Steam Supply Pressure – Low), 4 Channels	30
3.3.1 – Function 4.a	Reactor Vessel Water Level – Wide Range – Function 4.a (Low, Low, Low Level 1), 4 Channels	30
3.3.1 – Function 4.b	Reactor Vessel Water Level – Wide Range – Function 4.b (Low, Low – Level 2), 4 Channels	30
3.3.1 – Function 5.a	Reactor Vessel Water Level – Narrow Range – Function 5.a (Low – Level 3), 4 Channels	30
3.3.1 – Function 6.a	Reactor Trip System – Function 6.a (Scram Discharge Volume Water Level – High Level Transmitter), 4 level transmitters	30
3.3.1 – Function 6.b	Reactor Trip System – Function 6.b (Scram Discharge Volume Water Level – High Float Switch), 4 switches	30
3.3.1 – Function 7	Reactor Trip System – Function 7 (Reactor Mode Switch Position), 4 Channels	30
3.3.1 – Function 8	Drywell Function 8 – Drywell Pressure – High, 4 Channels	30
3.3.1 – Function 9	Drywell Function 9 – Primary Containment Instrument Gas Line to Drywell Δ Pressure – Low, 2 Channels	30
3.3.1 – Function 10	Emergency Core Cooling System – Function 10 (Condensate Storage Tank Level – Low), 4 Channels	30
3.3.1 – Function 13	High Pressure Coolant Injection (HPCI) – Function 13 (Suppression Pool Water Level – High), 2 Channels	30

Table E1-2: In-Scope TS/LCO Conditions RICT Estimate		
Technical Specification (TS)	**TS LCO condition**	**RICT Estimate Days[1]**
3.3.1 – Function 14	High Pressure Coolant Injection (HPCI) – Function 14 (HPCI Steam Line Δ Pressure – High), 2 Channels	30
3.3.1 – Function 15	High Pressure Coolant Injection (HPCI) – Function 15 (HPCI Turbine Exhaust Diaphragm Pressure – High), 4 Channels	30
3.3.1 – Function 16	High Pressure Coolant Injection (HPCI) – Function 16 (HPCI Equipment Room Temperature – High), 2 Channels	30
3.3.1 – Function 17	High Pressure Coolant Injection (HPCI) – Function 17 (HPCI Equipment Room Δ Temperature – High), 2 Channels	30
3.3.1 – Function 18	High Pressure Coolant Injection (HPCI) – Function 18 (HPCI Pipe Routing Area Temperature – High), 8 Channels	30
3.3.1 – Function 19	Main Steam, Turbine, Condenser – Function 19 (Main Steam Line Isolation Valve – Closure), 4 Channels	30
3.3.1 – Function 20	Main Steam, Turbine, Condenser – Function 20 (Turbine Stop Valve – Closure), 4 Channels	30
3.3.1 – Function 21	Main Steam, Turbine, Condenser – Function 21 (Turbine Control Valve Fast Closure, Trip Oil Pressure – Low), 4 Channels	30
3.3.1 – Function 22	Main Steam, Turbine, Condenser – Function 22 (Main Steam Line Pressure – Low), 4 Channels	30
3.3.1 – Function 23	Main Steam, Turbine, Condenser – Function 23 (Main Steam Line Flow – High), 4 Channels per Steam Line	30
3.3.1– Function 24	Main Steam, Turbine, Condenser Function 24 Condenser Vacuum – Low 4 Channels	30
3.3.1– Function 25	Main Steam, Turbine, Condenser Function 25	30

Table E1-2: In-Scope TS/LCO Conditions RICT Estimate		
Technical Specification (TS)	TS LCO condition	RICT Estimate Days[1]
	Outboard MSIV Room Temperature – High 4 Channels	
3.3.1–Function 26	Reactor Water Cleanup System and Standby Liquid Control – Function 26 (RWCS Δ Flow – High), 2 Channels	30
3.3.1–Function 27	Reactor Water Cleanup System and Standby Liquid Control – Function 27 (RWCS Area Temperature – High), 12 Channels	30
3.3.1–Function 28	Reactor Water Cleanup System and Standby Liquid Control – Function 28 (RWCS Area Ventilation Δ Temperature – High), 12 Channels	30
3.3.1–Function 29	Reactor Water Cleanup System and Standby Liquid Control – Function 29 (SLCS Initiation), 3 Channels	30
3.3.1–Function 30	Reactor Core Isolation Cooling (RCIC) – Function 30 (RCIC Steam Line Δ Pressure – High), 2 Channels	30
3.3.1–Function 31	Reactor Core Isolation Cooling (RCIC) – Function 31 (RCIC Turbine Exhaust Diaphragm Pressure – High), 4 Channels	30
3.3.1–Function 32	Reactor Core Isolation Cooling (RCIC) – Function 32 (RCIC Equipment Room Temperature – High), 2 Channels	30
3.3.1–Function 33	Reactor Core Isolation Cooling (RCIC) – Function 33 (RCIC Equipment Room Δ Temperature – High), 2 Channels	30
3.3.1–Function 34	Reactor Core Isolation Cooling (RCIC) – Function 34 (RCIC Pipe Routing Area Temperature – High), 10 Channels	30
3.3.2.a.1.a	Plant Protection System (PPS) – 4 Divisions	30

Table E1-2: In-Scope TS/LCO Conditions RICT Estimate		
Technical Specification (TS)	**TS LCO condition**	**RICT Estimate Days[1]**
3.3.4.1.a – Function 1	Anticipated Transient Without Scram Recirculation Pump Trip (ATWS-RPT) System Instrumentation – Function 1 (Reactor Vessel Water Level – Wide Range, Low Low Level 2), 4 Channels	30
3.3.4.1.a – Function 2	Anticipated Transient Without Scram Recirculation Pump Trip (ATWS-RPT) System Instrumentation – Function 2 (Reactor Vessel Steam Dome Pressure – High), 4 Channels	30
3.3.4.1.c	Two ATWS Recirculation Pump Trip System Instrumentation Subsystems	30
3.3.4.2.a	Two End-of-Cycle Recirculation Pump Trip (EOC-RPT) subsystems	30
3.5.1.d.3.a	Automatic Depressurization System (ADS) – two subsystems controlling five ADS valves (HPCI and RCIC OPERABLE)_	30
3.5.1.d.3.b	Automatic Depressurization System (ADS) – two subsystems controlling five ADS valves (HPCI or RCIC INOPERABLE)_	30

Table E1-2 Notes:

1. RICTs are based on the internal events, internal flood, and internal fire PRA model calculations with seismic CDF and LERF penalties included as a constant risk addition for all configurations. RICTs calculated to be greater than 30 days are capped at 30 days based on NEI 06-09-A [2]. RICTs are rounded to nearest tenth of a day for illustrative purposes.

Table E1-2 above lists the calculated RICTs for each TS condition using the method outlined in NEI 06-09-A [2] shown below. The same equation was used to calculate the LERF RICT by simply using the RICT ICLERP Limit and ΔLERF instead.

$$RICT\ (days) = \frac{ICCDP\ Threshold}{Total\ \Delta CDF(\frac{1}{yr})}\ x\ 365\ (\frac{days}{yr})$$

The RICT ICCDP threshold is 1.00E-05, while the RICT ICLERP threshold is 1.00E-06. The RICTs are limited to a maximum of thirty (30) days, and to a minimum of the original TS completion time.

Table E1-2 provides example RICT calculations for the purposes of this Enclosure. Following initiative 4b implementation, the RICT will be calculated using the actual plant configuration and may deviate from the example values.

Table E1-3 lists the TSTF-505 Revision 2 Table 1 Technical Specifications (TS) that require additional justification along with a description of how the additional justification is provided in the LAR.

Table E1-3: TSTF-505 Rev. 2 Table TS that Require Additional Justification			
TS Description	**TSTF-505 Tech Spec**	**LGS Tech Spec**	**Additional Justification**
End of Cycle Recirculation Pump Trip (EOC-RPT) Instrumentation - One or more required channels inoperable.	3.3.4.1.a	3.3.4.2.a	See explanation in Attachment 4 for LGS Tech Spec 3.3.4.2.a. Additionally, the RPT breakers will be used as surrogates to calculate a RICT for EOC-RPT subsystems.

3. References

[1] NRC Letter to NEI, "Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, “Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines," dated May 17, 2007 (ADAMS Accession No. ML071200238).

[2] NEI Topical Report (TR) NEI 06-09-A, "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines," Revision 0-A, dated October 12, 2012 (ADAMS Accession No. ML 12286A322).

[3] ASME Standard ASME/ANS RA-Sa-2009, "Addenda to ASME/ANS RA-S-2008 Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications," dated February 2, 2009.

[4] LG-LAR-041, rev 0, " RICT Estimates for TSTF-505 (RICT) Program LAR submittal for digital modification"

ENCLOSURE 2

License Amendment Request

Limerick Generating Station, Units 1 and 2
Docket Nos. 50-352 and 50-353

License Amendment Request to Reinstate and Apply Risk-Informed Completion Time (RICT) Applications

Information Supporting Consistency with Regulatory Guide 1.200, Revision 3

1. Introduction

This enclosure provides information on the technical adequacy of the Limerick Generating Station (LGS) Probabilistic Risk Assessment (PRA) internal events model (including flooding) and the LGS fire PRA model in support of the license amendment request to revise Technical Specifications to implement NEI 06-09-A, “Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines,” [1].

NEI 06-09, Revision 0-A, as clarified by the NRC final safety evaluation [2], defines the technical attributes of a PRA model and its associated Configuration Risk Management Program (CRMP) tool, presently referred to as the Real-Time Risk (RTR) tool consistent with Constellation fleet usage, required to implement this risk-informed application. Meeting these requirements satisfies Regulatory Guide (RG) 1.174 [3] requirements for risk-informed plant-specific changes to a plant's licensing basis.

Constellation employs a multi-faceted approach to establishing and maintaining the technical acceptability and fidelity of PRA models for its operating nuclear generation sites. This approach includes both a proceduralized PRA maintenance and update process and the use of self-assessments and independent peer reviews.

Section 2 of this enclosure describes requirements related to the scope of the LGS PRA models. Section 3 addresses the technical adequacy of the PRA models used for this application. Section 4 lists references used in the development of this enclosure.

As described in NRC's Safety Evaluation for the LGS TSTF-591 program [4], LGS will transition to RG 1.200, Revision 3 [5] to implement TSTF-591. The NRC finds it acceptable to continue referencing RG 1.200, Revision 2, for demonstrating PRA technical adequacy because Revision 3 does not change the staff’s endorsement of the ASME/ANS RA-Sa-2009 Standard, other than modifying terminology as described in Appendix A of RG 1.200. As stated in RG 1.200, Revision 3:

> The staff's previous endorsement of ASME/ANS RA-Sa-2009 in RG 1.200, Revision 2, issued March 2009, (Ref. 24 [sic]), has been modified to reflect endorsement of terms and their definitions derived from PWROG-19027-NP, Revision 2. However, all other portions of the staff’s endorsement of ASME/ANS RA-Sa-2009 from RG 1.200, Revision 2, are otherwise not changed by this revision, as provided in Appendix A to this RG.

Hence it is acceptable to refer to RG 1.200, Revision 2, to demonstrate technical acceptability of the LGS PRA models.

All the PRA models described below have been peer reviewed. The review and closure of the original finding-level F&Os from the peer review were independently evaluated to confirm that the associated model changes did not constitute a PRA upgrade. Section 3 provides a summary of the current status of the Limerick PRA models and the disposition of any new open findings since the original RICT SE was issued.

2. Requirements Related to Scope of LGS PRA Models

Both the LGS internal events PRA model including internal flooding and the LGS fire PRA model are at-power models (i.e., they directly address plant configurations during plant modes 1 and 2 of reactor operation). The models include both core damage frequency (CDF) and large early release frequency (LERF).

The PRA models discussed in this enclosure have been evaluated against RG 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," Revision 2 [6] consistent with NRC Regulatory Information Summary (RIS) 2007-06 [7].

F&O closure reviews were conducted on the PRA models discussed in this enclosure. Resolved findings were reviewed and closed using the process documented in Appendix X to NEI 05-04, NEI 07-12 and NEI 12-13, "Close-out of Facts and Observations (F&Os)" [8] as accepted by NRC in the letter dated May 3, 2017 [9].

3. Scope and Technical Acceptability of LGS PRA Models

The PRA peer review history supporting the original LGS RICT application was previously reviewed and accepted by the NRC in its Safety Evaluation [10]. Therefore, this enclosure focuses on PRA peer reviews and independent assessments completed since issuance of the original RICT Safety Evaluation, as these reviews demonstrate the current technical adequacy of the PRA models used in support of this application.

Since the original RICT Safety Evaluation, LGS completed an F&O Independent Assessment for the internal events and internal flooding PRA models in accordance with NEI 17-07 [11]. This assessment, performed in April 2021 [12], reviewed all finding-level F&Os from prior peer reviews and confirmed that each had been adequately addressed. All finding-level F&Os for the internal events and internal flooding PRA models were closed, and no open or partially resolved findings remained.

The digital I&C PRA modeling developed to support the LGS Digital Modernization Project represents a new system that did not exist at the time of the original LGS RICT application. A focused-scope PRA peer review of the digital I&C modeling was conducted in July 2024 [13] in accordance with the ASME/ANS RA-Sa-2009 PRA Standard [14] and NRC-endorsed peer review processes. This review evaluated the modeling of the new Plant Protection System (PPS) and Distributed Control System (DCS) along with its associated digital components against the applicable data and system supporting requirements of the ASME/ANS RA-Sa-2009 Standard. No new methods were employed in the incorporation of the digital systems into the PRA model, no existing methods were applied in a different context, and no additional

Supporting Requirements became applicable. As such, none of the changes were considered upgrades; however, a focused-scope peer review was performed due to the extent of the changes. The peer review identified 12 finding-level F&Os requiring resolution prior to achieving the capability categories normally expected for a full-scope application. In 2025, an independent assessment was conducted [15] in accordance with NEI 17-07 [11] to evaluate the resolutions of the initial peer review findings and confirm the nature and basis of the open issues.

Following the completion of the F&O closure review [15], three open findings remained. The first open finding (02-017) identified some specific issues that needed to be addressed to fully meet the intent of the SR. These issues were related to specific aspects of the PPS/DCS logic modeling and associated documentation. These remaining open items identified in F&O 02-017 have mostly been addressed in the Application Specific Model used for this RICT LAR application [16]. There are still 2 of the 6 sub items to 02-017 that are not fully resolved. These 2 items (details of MSIV closure logic and secondary RPS inputs) will be resolved prior to implementation but will have minimal impact on the RICT results. The other two findings (03-006 and 03-007) relate to the need for plant-specific modeling evidence, operating experience, and parameter data to support the characterization of significant digital basic events and associated uncertainties. Because the digital PPS/DCS has not yet accumulated plant-specific operating history, these findings remain open at this time. These open findings do not involve modeling deficiencies or method-related issues and do not challenge the suitability of the digital I&C PRA modeling for use in this RICT application. Consistent with NRC guidance and industry precedent for upgrades involving new digital systems, LGS will resolve these findings once sufficient plant-specific operating data exist to support parameter estimation, uncertainty characterization, and, where required, Bayesian updating.

For the LGS Fire PRA, since the issuance of the SE, a model upgrade was completed to implement new High Energy Arching Fault guidance in NUREG-2262 [17]. A focused scope peer review was completed in March 2026 [18] and identified 3 finding-level F&Os. An F&O Independent Assessment in accordance with NEI 17-07 [11] was performed in April 2026 [19] confirmed that each had been adequately addressed. All finding-level F&Os for the Fire PRA model were closed, and no open or partially resolved findings remained.

Based on the post-SE focused-scope peer review and independent assessment activities, the internal events, internal flooding, and internal fire models including the new digital I&C PRA modeling used to support this application meets the PRA scope and technical adequacy expectations for this submittal.

Table E2-2 LGS FPIE PRA Findings and Disposition

Finding ID	Originating SR	Finding	Status	Disposition	PRA Upgrade Determination and Basis[1]	Impact to TSTF-505 Implementation
02-017	SY-C2	The peer review team determined that additional documentation and justification are required to demonstrate that the digital I&C modeling approach fully satisfies the applicable Supporting Requirements, including clear identification of modeled and screened components and the basis for digital failure representations.	Partially Addressed	Four out of the six remaining issues / items associated with this finding have been addressed in the Application Specific Model used as part of this RICT application.	Maintenance Basis: The resolution of this finding consists of enhancements to documentation clarity, traceability, and justification of modeling assumptions for digital I&C components, including identification of modeled versus screened components and characterization of associated uncertainties. These changes do not introduce new PRA methods, do not apply existing methods in a different context, and do not result in additional Supporting Requirements becoming applicable. The underlying modeling approach, methods, and PRA scope remain unchanged. Therefore, the change is classified as PRA maintenance in accordance with RG 1.200 Rev. 3. This determination applies to the resolution of the specific finding and does not alter the overall PRA upgrade determination for the digital I&C model implementation.	None. The 2 sub items associated with this finding will be resolved prior to TSTF-505 implementation. These 2 items do not impact the ability of the PRA model to support RICT calculations. Resolving these items are expected to have minimal impact on the RICT results.

[1] The evaluations provided in Table E2-2 address whether the resolution of individual peer review findings constitutes a PRA upgrade or maintenance in accordance with RG 1.200 Rev. 3.

Table E2-2 LGS FPIE PRA Findings and Disposition

Finding ID	Originating SR	Finding	Status	Disposition	PRA Upgrade Determination and Basis[1]	Impact to TSTF-505 Implementation
03-006	DA-D1	CC-II requires plant-specific evidence and data to support parameter estimates for significant digital basic events. Plant-specific PPS/DCS failure data are not yet available to meet the required capability category.	Open	The finding will be closed when sufficient plant-specific evidence is collected to support the characterization of PPS/DCS failure parameters and their associated uncertainties. Closure is dependent on the accumulation of operating experience for the digital system.	Maintenance Basis: The resolution of this finding involves collection and incorporation of plant-specific data to support parameter estimation for significant basic events and associated uncertainties. This represents a refinement of input data within the existing PRA and does not introduce new PRA methods, apply existing methods in a different context, or result in additional Supporting Requirements becoming applicable. The underlying modeling approach, including treatment of digital system failure parameters remains unchanged, and sensitivity evaluations confirm that model behavior and results are not materially altered. Therefore, the change is classified as PRA maintenance in accordance with RG 1.200 Rev. 3. This determination applies to the resolution of the specific finding and does not alter the overall PRA upgrade determination for the digital I&C model implementation.	None. This data-dependent finding does not impact the ability of the PRA model to support RICT calculations. Parameter uncertainty remains conservatively treated, and the PRA is suitable for this application.

Table E2-2 LGS FPIE PRA Findings and Disposition

Finding ID	Originating SR	Finding	Status	Disposition	PRA Upgrade Determination and Basis[1]	Impact to TSTF-505 Implementation
03-007	DA-D4	A Bayesian update using plant-specific operating experience is required to meet CC-II/III for significant digital basic events. Because the digital PPS/DCS system is newly installed, plant-specific operating history is not yet available.	Open	The finding will be closed once sufficient operating evidence has been collected to support a Bayesian update for digital system failure rates and uncertainty characterization. Closure is contingent on post-installation operational data becoming available.	Maintenance Basis: The resolution of this finding identifies the future use of Bayesian updating with plant-specific data to refine parameter estimates for digital system basic events; however, this approach has not yet been implemented in the PRA. Current model treatment remains based on existing methods and assumptions, with sensitivity evaluations used to assess potential impacts of plant-specific data. As such, no new PRA methods have been introduced, no existing methods have been applied in a different context, and no additional Supporting Requirements have become applicable. Therefore, the change is classified as PRA maintenance in accordance with RG 1.200 Rev. 3. This determination applies to the resolution of the specific finding and does not alter the overall PRA upgrade determination for the digital I&C model implementation.	None. The absence of plant-specific data does not impact the PRA's suitability for RICT calculations, and conservative parameter treatment is maintained until the Bayesian update can be performed.

4. References

[1] NEI 06-09-A, "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines," Revision 0, dated October 12, 2012 (ML12286A322).

[2] NRC letter to NEI, "Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, 'Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines," dated May 17, 2007 (ML071200238).

[3] NRC Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," Revision 3, dated January 2018 (ML17317A256).

[4] NRC Technical Specifications Task Force Letter, "Final Safety Evaluation of Technical Specifications Task Force Traveler TSTF-591, Revision 0, "Revise Risk-Informed Completion Time (RICT) Program" (EPID L-2022-PMP-0003)," dated September 21, 2023 ((ML23262B230 (Final SE) and ML23262B229 (Cover Ltr)).

[5] NRC Regulatory Guide 1.200, "Acceptability of Probabilistic Risk Assessment Results for Risk-Informed Activities," Revision 3, dated December 2020 (ML20238B871).

[6] NRC Regulatory Guide 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," Revision 2, dated March 2009 (ML090410014).

[7] NRC Regulatory Issue Summary 2007-06, "Regulatory Guide 1.200 Implementation," dated March 22, 2007 (ML070650428).

[8] NEI Letter to NRC, "Final Revision of Appendix X to NEI 05-04/07-12/12-16, Close-Out of Facts and Observations (F&Os)," dated February 21, 2017 (ML17086A431).

[9] NRC letter to NEI, "U.S. Nuclear Regulatory Commission Acceptance on Nuclear Energy Institute Appendix X to Guidance 05-04, 7-12, and 12-13, Close Out of Facts and Observations (F&Os)," dated May 3, 2017 (ML17079A427).

[10] NRC Letter to Exelon, Limerick Generating Station, Units 1 and 2, "Issuance of Amendment Nos. 240 and 203 to Implement TSTF-505, Revision 2, 'Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b'," dated February 28, 2020 (ML20034F637).

[11] NEI Topical Report NEI 17-07, "Performance of PRA Peer Reviews Using the ASME/ANS PRA Standard," Revision 2, dated August 2019 (ML19228A242).

[12] Jensen Hughes Report No. 32466-RPT-005, "Limerick Units 1 and 2 PRA Finding Level Fact and Observation Independent Assessment," Revision 0, dated May 10, 2021.

[13] Westinghouse Electric Company Report PWROG-24012-P, "Limerick Focused Scope PRA Peer Review for Digital I&C Modeling," Revision 0, Risk Management Committee PA-RMSC-1974, September 2024.

[14] ASME/ANS RA-Sa-2009, "Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications," Addendum A to RAS-2008, ASME, New York, NY, American Nuclear Society, La Grange Park, Illinois, February 2009.

[15] Westinghouse Electric Company Report PWROG-25008-P, "F&O Closure for the Limerick Focused Scope PRA Peer Review for Digital I&C Modeling," Revision 0, Risk Management Committee PA-RMSC-1974, June 2025.

[16] LG-ASM-017, "Limerick Generating Station Probabilistic Risk Assessment Application-Specific Model (ASM)," Revision 0, June 2026.

[17] High Energy Arcing Fault Frequency and Consequence Modeling. EPRI, Palo Alto, CA, and the U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research (RES), Washington, D.C.: 2023. 3002025942 / NUREG-2262.

[18] LG-MISC-050, "Focused Scope Peer Review of HEAF NUREG-2262 Implementation," Rev. 0, March 2026.

[19] LG-MISC-051, "F&O Closure Independent Assessment (Fire PRA - NUREG-2262 Focused Scope Peer Review F&Os)," Revision 0.

ENCLOSURE 5

License Amendment Request

Limerick Generating Station, Units 1 and 2
Docket Nos. 50-352 and 50-353

License Amendment Request to Reinstate and Apply Risk-Informed Completion Time (RICT) Applications

<u>Baseline Core Damage Frequency (CDF) and Large Early Release Frequency (LERF)</u>

1. Introduction

Section 4.0, Item 6 of the Nuclear Regulatory Commission's (NRC) Final Safety Evaluation [1] for NEI 06-09-A, "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines," Revision 0 [2] requires that the license amendment request (LAR) provide the plant-specific total CDF and LERF to confirm applicability of the limits of Regulatory Guide (RG) 1.174, Revision 1 [3]. (Note that RG 1.174, Revision 3 [4] issued by the NRC in January 2018 did not revise these limits.)

The purpose of this enclosure is to demonstrate that the Limerick Generating Station (LGS) total Core Damage Frequency (CDF) and total Large Early Release Frequency (LERF) are below the guidelines established in RG 1.174. RG 1.174 does not establish firm limits for total CDF and LERF but recommends that risk-informed applications be implemented only when the total plant risk is no more than about 1E-4/year for CDF and 1E-5/year for LERF. Demonstrating that these limits are met confirms that the risk metrics of NEI 06-09-A can be applied to the LGS Risk Informed Completion Time (RICT) Program.

2. Technical Approach

Table E5-1 lists the LGS Unit 1 and Unit 2 CDF and LERF values that resulted from a quantification of the baseline internal events (including internal flooding) and fire Probabilistic Risk Assessment (PRA) models (References [5] and [6], respectively). This table also includes an estimate of the seismic contribution to CDF and LERF as accepted by the NRC [7] Other external hazards are below accepted screening criteria and therefore do not contribute significantly to the totals.

Table E5-1
Total Baseline CDF/LERF

Limerick Unit 1 Baseline CDF			**Limerick Unit 1 Baseline LERF**	
Source	**Contribution**		**Source**	**Contribution**
Internal Events PRA	2.4E-06		Internal Events PRA	9.7E-08
Fire PRA	2.3E-06		Fire PRA	2.1E-07
Seismic	3.7E-06		Seismic	1.9E-06
Other External Events	No significant contribution		Other External Events	No significant contribution
Total Unit 1 CDF	**8.4E-06**		**Total Unit 1 LERF**	**2.2E-06**
Limerick Unit 2 Baseline CDF			**Limerick Unit 2 Baseline LERF**	
Source	**Contribution**		**Source**	**Contribution**
Internal Events PRA	2.5E-06		Internal Events PRA	9.7E-08
Fire PRA	3.2E-06		Fire PRA	5.7E-07
Seismic	3.7E-06		Seismic	1.9E-06
Other External Events	No significant contribution		Other External Events	No significant contribution
Total Unit 2 CDF	**9.4E-06**		**Total Unit 2 LERF**	**2.6E-06**

As demonstrated in Table E5-1, the total CDF and total LERF are within the guidelines set forth in RG 1.174 and support small changes in risk that may occur during RICT entries following TSTF-505 implementation. Therefore, LGS TSTF-505 implementation is consistent with NEI 06-09-A guidance.

3. References

[1] NRC Letter to NEI, "Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines," dated May 17, 2007 (ML071200238).

[2] Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines," Revision 0-A, October 12, 2012 (ML12286A322).

[3] Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," Revision 1, dated November 2002 (ML023240437).

[4] Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," Revision 3, dated January 2018 (ML17317A256).

[5] LG-ASM-17 – FPIE ASM Rev. 0.

[6] LG-ASM-18 – FPRA ASM Rev. 0.

[7] NRC Letter to Exelon, Limerick Generating Station, Units 1 and 2, "Issuance of Amendment Nos. 240 and 203 to Implement TSTF-505, Revision 2, 'Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b'," dated February 28, 2020 (ML20034F637).

ENCLOSURE 9

License Amendment Request

Limerick Generating Station, Units 1 and 2
Docket Nos. 50-352 and 50-353

License Amendment Request to Reinstate and Apply
Risk-Informed Completion Time (RICT) Applications

Key Assumptions and Sources of Uncertainty

1. Introduction and Purpose

This enclosure addresses the treatment of key assumptions and sources of uncertainty associated with the use of the Risk-Informed Completion Time (RICT) program following implementation of the Limerick digital instrumentation and control (I&C) modification. The digital modification replaces the existing safety-related analog reactor protection and associated control systems with a digital plant protection system (PPS) platform as described in the NRC Safety Evaluation approving the digital I&C modification [1].

The RICT program for Limerick Units 1 and 2 was previously approved by the NRC based on the plant probabilistic risk assessment (PRA) models and uncertainty evaluation documented in the original RICT license amendment request (LAR) [2] and the associated NRC Safety Evaluation [3]. Enclosure 9 of the original application evaluated key assumptions and sources of uncertainty associated with the PRA models used to support the RICT program, including uncertainties associated with the internal events PRA, fire PRA, and the real-time risk assessment (RTR) implementation used to calculate configuration risk for RICT applications.

The uncertainty evaluation documented in the previously approved RICT application remains applicable to plant systems, PRA modeling assumptions, and Real-Time-Risk (RTR) implementation aspects that are not affected by the digital I&C modification. The digital modification does not change the underlying PRA modeling approach used for the RICT program or the general treatment of parameter, model, and completeness uncertainties associated with the existing PRA models.

Accordingly, this enclosure supplements the previously approved uncertainty evaluation by identifying and evaluating new or changed sources of uncertainty associated with the digital I&C modification that could affect the use of the PRA in the RICT application. The evaluation focuses on uncertainties associated with the modeling, reliability, and operational characteristics of the digital plant protection system and related instrumentation functions that could influence the identification of risk-significant configurations, the calculation of configuration risk for RICT entries, or the implementation of risk management actions (RMAs).

Consistent with the guidance of NUREG-1855 [4] and EPRI guidance on the treatment of PRA uncertainties in risk-informed applications ([5] and [6]), this review focuses on application-specific uncertainties introduced by the digital modification. Sources of uncertainty previously evaluated for the RICT program are not repeated unless they are directly affected by the digital modification.

Accordingly, this review:

- identifies digital-related assumptions and sources of uncertainty relevant to the RICT application, as documented in LG-LAR-040 [7];
- evaluates whether those items could materially affect PRA results or configuration risk calculations; and
- documents the disposition of each item.

2. Identification of Digital-Specific Sources of Uncertainty

This section identifies potential sources of uncertainty introduced by the implementation of the digital plant protection system and associated instrumentation changes that could affect the use of the PRA in the RICT application. The review focused on uncertainties associated with the modeling and operational characteristics of the digital protection system and the representation of those systems within the PRA and the real-time risk assessment (RTR) tool used to support RICT calculations.

Consistent with NUREG-1855 and supporting industry guidance, the evaluation considered potential uncertainties associated with the representation of digital system in the PRA, the reliability of digital protection system components, and the operational response to digital system failures.

The evaluation identified several areas where the digital I&C modification introduces new or potentially different sources of uncertainty compared to the previously approved RICT configuration. These areas primarily relate to the characteristics of the digital plant protection system and the representation of digital failures within the PRA models and RTR implementation.

Table E9-1 summarizes the digital-specific sources of uncertainty considered in this evaluation and provides the disposition of each item with respect to the RICT application. The table identifies the source of uncertainty, the potential impact on the PRA or RICT implementation, and the basis for determining whether the uncertainty represents a key assumption or source of uncertainty for the RICT program.

The review identified potential common cause failures associated with the digital plant protection system platform as the primary digital-specific source of uncertainty evaluated for the RICT application. The review also considered whether any digital-system uncertainties could affect the identification of risk-significant plant configurations, the calculation of configuration risk for RICT entries, or the implementation of appropriate risk management actions.

These sources of uncertainty are evaluated in the context of the RICT decision-making process to determine whether they could materially affect configuration risk calculations or the identification of appropriate RMAs. Where appropriate, qualitative evaluations or sensitivity considerations are used to confirm that the identified uncertainties do not significantly affect the conclusions supporting the RICT application.

Table E9-1: Digital-Specific Sources of Uncertainty Relevant to the RICT Application

Source of Uncertainty	Description of Uncertainty Introduced by Digital Modification	Potential Impact on PRA / RICT Application	Disposition / Basis
Digital Plant Protection System (PPS) Common Cause Failure (CCF)	The digital modification introduces a PPS implemented on a common hardware and software platform. Potential uncertainties include the possibility of common cause failures affecting multiple protection channels due to shared hardware architecture, software logic, or platform-specific design characteristics.	A common cause failure affecting multiple PPS divisions could challenge the availability of protection functions modeled in the PRA and could influence the risk significance of certain instrumentation-related configurations evaluated in the RICT program.	Sensitivity studies were performed to evaluate uncertainty associated with Digital PPS CCF assumptions using 5th- and 95th-percentile PPS CCF cases. For the representative instrumentation-related RICT cases reviewed, the resulting RMAT margins changed only negligibly. Similar stability was observed for the other representative Tech Spec LCO cases. These results indicate that reasonable variation in Digital PPS CCF assumptions does not significantly affect the calculated RICT results or challenge the applicable acceptance thresholds. Therefore, the possibility of common cause failures do not introduce a new key modeling uncertainty for the PRA used in the RICT program.

Table E9-1: Digital-Specific Sources of Uncertainty Relevant to the RICT Application

Source of Uncertainty	Description of Uncertainty Introduced by Digital Modification	Potential Impact on PRA / RICT Application	Disposition / Basis
Representation of Digital System Failure Modes in the PRA	Uncertainty may exist regarding the representation of digital protection system failure modes that differ from traditional analog instrumentation, including software logic faults, module-level failures, or latent faults detected through internal diagnostics.	Differences between digital and analog failure characteristics could affect the representation of instrumentation failures that contribute to protection system unavailability within the PRA.	The PRA models protection system failures at a functional level consistent with loss of the associated safety function. This approach encompasses the potential impact of both hardware and software digital failure modes. Therefore, the introduction of digital protection system failure modes does not introduce a new key modeling uncertainty for the PRA used in the RICT program.

Table E9-1: Digital-Specific Sources of Uncertainty Relevant to the RICT Application

Source of Uncertainty	Description of Uncertainty Introduced by Digital Modification	Potential Impact on PRA / RICT Application	Disposition / Basis
Diagnostic Coverage and Surveillance Replacement	The digital PPS includes built-in self-diagnostic capabilities that continuously monitor system health and detect certain failures that may not have been detectable in the legacy analog systems except through periodic surveillance testing. This introduces uncertainty regarding the effectiveness of diagnostic coverage relative to traditional testing approaches.	Changes in failure detection capability could affect assumptions regarding the availability or detectability of protection system failures represented in the PRA.	Digital system diagnostics enhance the ability to detect faults and degraded conditions in protection system components. The PRA modeling representation of the PPS functions are generally conservative with respect to failure detection and recovery assumptions. Therefore, the presence of enhanced diagnostic capabilities does not introduce a new key uncertainty for the PRA used in the RICT program.

Table E9-1: Digital-Specific Sources of Uncertainty Relevant to the RICT Application

Source of Uncertainty	Description of Uncertainty Introduced by Digital Modification	Potential Impact on PRA / RICT Application	Disposition / Basis
Human Response to Digital System Failures	The digital modification includes updated control room interfaces and alarm indications associated with the digital PPS. Uncertainty may exist regarding operator recognition and response to certain digital system failures or alarm conditions compared to the legacy analog configuration.	Operator response actions credited in the PRA for certain abnormal or degraded instrumentation conditions could potentially be influenced by differences in failure indications or alarm presentation associated with the digital system.	The digital system provides improved alarm management and system status information to operators through modern human-system interfaces. Existing human reliability analysis (HRA) assumptions remain acceptable for use because the credited operator actions and response strategies are unchanged. Therefore, digital control room interface changes do not introduce a new key source of uncertainty affecting the RICT application.

Table E9-1: Digital-Specific Sources of Uncertainty Relevant to the RICT Application

Source of Uncertainty	Description of Uncertainty Introduced by Digital Modification	Potential Impact on PRA / RICT Application	Disposition / Basis
Representation of Digital Equipment States in the Real-Time Risk Assessment (RTR) Tool	The RICT program relies on a real-time risk assessment tool to calculate configuration risk for equipment outages and degraded conditions. The introduction of digital instrumentation may require representation of digital equipment states or failure conditions within the RTR implementation.	Incorrect or incomplete representation of digital equipment states within the RTR model could affect the calculation of configuration risk used to determine allowable completion times under the RICT program.	The RTR implementation will be updated as necessary through established configuration control and model update processes to ensure that digital instrumentation states relevant to the RICT program are appropriately represented in configuration risk calculations. The underlying PRA logic used to support the RTR model remains unchanged. Therefore, the introduction of digital instrumentation does not introduce a new key source of uncertainty for the RICT application.

3. Summary and Conclusion

This enclosure evaluated potential sources of uncertainty introduced by the implementation of the digital plant protection system and associated instrumentation changes with respect to the use of the PRA in the RICT program. The evaluation focused on uncertainties associated with the modeling and operational characteristics of the digital protection system and the representation of those systems within the PRA models and the real-time risk assessment (RTR) implementation used to support RICT calculations.

As summarized in Table E9-1, the review identified several areas where the digital I&C modification introduces potential sources of uncertainty relative to the previously approved RICT application. These areas include potential common cause failures associated with the digital PPS platform, representation of digital failure modes in the PRA, enhanced diagnostic capabilities, operator interaction with digital system interfaces, and representation of digital equipment states within the RTR tool.

Each identified source of uncertainty was evaluated [7] to determine whether it could materially affect the PRA results used in the RICT application. Based on these evaluations, the identified digital-specific uncertainties do not represent new key assumptions or sources of uncertainty that would materially affect the PRA results used in the RICT application or the ability to assess and manage configuration risk in accordance with NEI 06-09-A [8].

The previously approved treatment of parameter, model, and completeness uncertainties for the Limerick PRA remains applicable, and the introduction of the digital plant protection system does not alter the overall uncertainty framework supporting the RICT program.

Therefore, the PRA models and RTR implementation remain suitable for use in the RICT program following implementation of the digital I&C modification, and the conclusions supporting the Limerick RICT application are unchanged.

4. References

[1] NRC letter to Constellation, Limerick Generating Station, Units 1 and 2, "Issuance of Amendment Nos. 268 and 230 to Revise the Licensing and Design Basis Related to the Replacement of Safety-Related Analog Control Systems with a Single Digital Plant Protection System," dated January 2, 2026 (ML25325A355).

[2] Letter from J. Barstow (Limerick) to U.S. Nuclear Regulatory Commission License Amendment Request to Revise Technical Specifications to Adopt Risk-Informed Completion Times TSTF-505, Revision 2, "Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b," dated December 13, 2018 (ML18347B366).

[3] NRC Letter to Exelon, Limerick Generating Station, Units 1 and 2, "Issuance of Amendment Nos. 240 and 203 to Implement TSTF-505, Revision 2, 'Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b'," dated February 28, 2020 (ML20034F637).

[4] NUREG-1855, "Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decision Making," Revision 1, March 2017 (ML17062A466).

[5] EPRI TR-1026511, "Practical Guidance on the Use of PRA in Risk-Informed Applications with a Focus on the Treatment of Uncertainty," dated December 2012.

[6] EPRI TR 1016737, "Treatment of Parameter and Model Uncertainty for Probabilistic Risk Assessments," dated December 2008.

[7] LG-LAR-040, "Evaluation of Digital Instrumentation Uncertainties Supporting the Risk-Informed Completion Time (RICT) Program," Revision 0, June 2026.

[8] Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines," Revision 0-A, October 12, 2012 (ML12286A322).

ENCLOSURE 12

License Amendment Request

Limerick Generating Station, Units 1 and 2
Docket Nos. 50-352 and 50-353

License Amendment Request to Reinstate and Apply
Risk-Informed Completion Time (RICT) Applications

Risk Management Action Examples

1. Introduction

This enclosure describes the process for identification and implementation of Risk Management Actions (RMAs) applicable during extended Completion Times (CTs) and provides representative examples of RMAs. RMAs are governed by plant procedures for planning and scheduling maintenance activities and provide guidance for the determination and implementation of RMAs when entering the Risk-Informed Completion Time (RICT) Program consistent with the guidance provided in NEI 06-09-A, Revision 0 [1].

The RMA process described in this enclosure was previously established and approved by the NRC as part of the original Limerick RICT license amendment request ([2] and [3]). The approach remains applicable to the plant following the digital instrumentation and control (I&C) modification that replaces the existing analog reactor protection and associated control systems with the digital Plant Protection System (PPS).

This enclosure provides representative examples of RMAs for selected Technical Specification (TS) conditions proposed for inclusion in the RICT Program. These examples reflect the plant configuration following implementation of the digital modification and include functions performed by the digital protection system instrumentation and associated actuation logic. The examples are intended to illustrate the types of compensatory actions that may be implemented to manage configuration risk during a RICT entry. The specific RMAs implemented for a given RICT entry will be determined in accordance with plant procedures based on the plant configuration and the results of the configuration-specific risk assessment.

2. Responsibilities

For planned entries into the RICT Program, Work Management is responsible for developing the RMAs with assistance from Operations and Risk Management. Operations is responsible for approval and implementation of RMAs. For emergent entry into extended CTs, Operations is also responsible for developing the RMAs.

3. Procedural Guidance

The process for identification and implementation of Risk Management Actions (RMAs) for the RICT Program at Limerick was previously established and approved by the NRC as part of the original RICT license amendment request [3]. The procedural framework described in that submittal continues to apply to the plant following implementation of the digital instrumentation and control (I&C) modification. RMAs will continue to be developed and implemented in accordance with plant procedures governing the configuration risk management program and maintenance planning processes, consistent with the guidance of NEI 06-09-A.

For planned maintenance activities, RMAs will be implemented when it is anticipated that the risk management action time (RMAT) could be exceeded. For emergent activities, RMAs will be implemented if the RMAT is reached and the RMAs will be reevaluated if plant conditions change such that the configuration-specific risk must be reevaluated. These RMAs are intended to protect redundant or diverse SSCs, reduce the likelihood of initiating events that rely on the affected function, and maintain the availability of mitigating systems needed to respond to potential plant transients or accidents during the RICT entry.

RMAs will be implemented in accordance with plant procedures no later than the time at which the incremental core damage probability (ICDP) reaches 1E-6 or the incremental large early release probability (ILERP) reaches 1E-7, consistent with NEI 06-09-A. RMAs will also be implemented if the instantaneous core damage frequency (ICDF) exceeds 1E-3 per year or the instantaneous large early release frequency (ILERF) exceeds 1E-4 per year for an emergent condition.

Consistent with the original RICT program description [2], RMAs are developed based on insights from the plant PRA models and the configuration-specific risk assessment. These insights identify structures, systems, and components (SSCs) that are most important from a core damage frequency (CDF) or large early release frequency (LERF) perspective and support the identification of compensatory measures to protect those SSCs or enhance mitigation capability during the RICT entry. Guidance in NUREG-1855 [4] and EPRI TR-1026511 [5] may be used in examining PRA results to support identification of appropriate RMAs.

The RMAs provided in Section 4 of this enclosure are representative examples applicable to selected Technical Specification (TS) conditions included in the RICT Program following implementation of the digital protection system. These examples illustrate the types of compensatory actions that may be implemented to manage configuration risk when instrumentation channels, logic divisions, or associated mitigating systems are inoperable. The specific RMAs implemented for a given RICT entry will be determined by plant procedures based on the configuration-specific risk assessment and the plant operating condition.

4. Representative Risk Management Action (RMA) Examples

This section provides representative examples only. The actual RMAs selected for a given RICT entry will be established in accordance with plant procedures based on the specific degraded equipment, the risk-significant contributors identified by the configuration-specific risk assessment, the associated assumptions and uncertainties, and the need to maintain adequate defense-in-depth during the RICT entry.

4.1 Reactor Trip and Plant Protection Instrumentation examples

Applicable to TS 3.3.1 and TS 3.3.2 conditions involving loss of RPS/PPS channel or division redundancy.

Representative RMAs for these TS conditions may include the following:

- Brief the operating crew on the degraded automatic trip or actuation capability, applicable compensatory measures, and relevant abnormal and emergency operating procedures, including manual scram readiness where appropriate.

- Designate the remaining operable trip channels, divisions, and associated power supplies as protected equipment and defer elective maintenance, testing, or troubleshooting on those components.

- Defer elective maintenance or testing on plant equipment that could cause a reactor transient, turbine trip, feedwater perturbation, recirculation perturbation, loss of offsite power, or other initiating event that would increase reliance on the affected trip or protective function.

- Defer elective maintenance on mitigating systems that may be relied upon if the affected trip function were challenged (e.g., HPCI, RCIC, ADS, LPCI, Core Spray, and associated support systems), as appropriate to the plant configuration.

- Restrict nonessential evolutions that could increase transient likelihood or reduce operator response margin.

- For planned entries, perform advance work planning actions (e.g., walkdowns, pre-job briefs, confirmation of parts and personnel availability) to minimize restoration time.

4.2 ATWS Recirculation Pump Trip and End-of-Cycle Recirculation Pump Trip examples

Applicable to TS 3.3.4.1 and TS 3.3.4.2 conditions involving loss of channel or subsystem redundancy in the ATWS Recirculation Pump Trip (ATWS-RPT) System Instrumentation or the End-of-Cycle Recirculation Pump Trip (EOC-RPT) System Instrumentation.

Representative RMAs for these TS conditions may include the following:

- Brief the operating crew on the degraded recirculation pump trip capability, the expected response to a turbine trip or fast pressurization transient, and the applicable operator actions if the remaining automatic trip function fails to actuate.

- Defer elective maintenance or testing on the remaining ATWS-RPT or EOC-RPT subsystem, on turbine stop valve or turbine control valve instrumentation credited to generate the trip signal, and on associated logic, power supplies, or breaker functions needed for successful recirculation pump trip.

- Restrict nonessential evolutions, power maneuvers, control system testing, switching evolutions, or other activities that increase the likelihood of turbine trip, fast pressure increase, or other transients for which recirculation pump trip provides mitigation benefit.

- Defer elective maintenance or testing on other mitigating systems that may be relied upon if a transient occurs during the degraded configuration.

- If the RICT entry is planned, confirm restoration resources in advance, pre-stage required parts and personnel, and perform pre-job walkdowns or pre-job briefs to minimize the outage duration.

4.3 Automatic Depressurization System and Related ECCS examples

Applicable to TS 3.5.1.d.3.a and TS 3.5.1.d.3.b conditions involving one Automatic Depressurization System (ADS) subsystem inoperable and the associated dependence on low-pressure ECCS injection capability.

Representative RMAs for these TS conditions may include the following:

- Designate the remaining ADS subsystem and associated ADS valves as protected equipment and defer elective maintenance or testing on those components.

- Defer elective maintenance or testing on HPCI and RCIC when those systems are available and provide high-pressure makeup capability during the degraded ADS configuration.

- Defer elective maintenance or testing on low-pressure injection and heat removal systems that depend on successful depressurization, including LPCI, Core Spray, and supporting cooling water, AC power, DC power, room cooling, and instrument air systems, as appropriate.

- Restrict concurrent work that would increase the likelihood of a transient or reduce the availability of the remaining injection or depressurization capability.

- Brief the operating crew on the degraded ADS configuration and the associated manual depressurization, injection, and emergency procedure actions that may be required if plant conditions deteriorate.

- For a planned RICT entry, perform work planning actions intended to minimize the duration of the outage, including parts verification, personnel availability review, and pre-job walkdowns.

4.4 Electrical Support to Risk-Significant Instrumentation and Mitigating Systems

For RICT entries involving TS conditions that depend on electrical power supporting risk-significant instrumentation or mitigating systems (e.g., TS 3.3.1, TS 3.3.2, TS 3.3.4, and TS 3.5.1), additional RMAs may be appropriate to protect the remaining AC and DC power sources, electrical distribution equipment, and associated support systems.

Accordingly, where warranted by the specific plant configuration, RMAs for the TS conditions addressed above may also include:

- Deferral of elective maintenance in the switchyard, station electrical distribution systems, main and auxiliary transformers, battery chargers, batteries, inverter supplies, and other electrical equipment supporting the remaining operable function.

- Designation of the remaining electrical buses or power supplies credited by the configuration-specific risk assessment as protected equipment.

- Review and implementation of applicable abnormal operating procedures or contingency actions associated with the affected electrical configuration.

- For planned RICT entries, pre-job walkdowns, confirmation of parts availability, and resource planning intended to minimize restoration time.

5. References

[1] Nuclear Energy Institute (NEI) Topical Report (TR) NEI 06-09, "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines," Revision 0-A, October 12, 2012 (ADAMS Accession No. ML12286A322).

[2] Letter from J. Barstow (Limerick) to U.S. Nuclear Regulatory Commission License Amendment Request to Revise Technical Specifications to Adopt Risk-Informed Completion Times TSTF-505, Revision 2, "Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b," dated December 13, 2018 (ML18347B366).

[3] NRC Letter to Exelon, Limerick Generating Station, Units 1 and 2, "Issuance of Amendment Nos. 240 and 203 to Implement TSTF-505, Revision 2, 'Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b'," dated February 28, 2020 (ML20034F637).

[4] NUREG-1855, "Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decision Making," Revision 1, March 2017 (ML17062A466).

[5] EPRI TR-1026511, "Practical Guidance on the Use of PRA in Risk-Informed Applications with a Focus on the Treatment of Uncertainty," dated December 2012.