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10 CFR 50.90

January 7, 2020

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: Response to Request for Additional Information
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."

References:

1. Letter from J. Barstow (Exelon Generation Company, LLC) 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 (ADAMS Accession No. ML18347B366).

2. Letter from D. Helker (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, “Supplement to 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 February 14, 2019 (ADAMS Accession No. ML19045A011).

3. Letter from D. Gudger (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, “Response to Request for Additional Information, 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 August 12, 2019 (ADAMS Accession No. ML19224B705).

4. Letter from D. Helker (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, “Response to Request for Additional Information, 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 August 27, 2019 (ADAMS Accession No. ML19239A004).

5. Electronic mail message from V. Sreenivas, U.S. Nuclear Regulatory Commission, to G. Stewart, Exelon Generation Company, LLC, "Limerick- Request for Additional Information: Risk Informed Completion Times TSTF-505, Revision 2, ‘Provide Risk-Informed Completion Times – RITSTF Initiative 4b’ (EPID L-2018-LLA-0567)," dated December 9, 2019 (ADAMS Accession No. ML19344A024).

By letter dated December 13, 2018 (Reference 1), as supplemented by letters dated February 14, 2019 (Reference 2), August 12, 2019 (Reference 3) and August 27, 2019 (Reference 4), Exelon Generation Company, LLC (Exelon) requested an amendment to the Renewed Facility Operating License Nos. NPF-39 and NPF-85 for Limerick Generating Station (Limerick), Units 1 and 2, respectively.

The proposed amendment would modify Technical Specifications (TS) requirements to permit the use of risk-informed completion times (RICTs) in accordance with the Technical Specifications Task Force (TSTF) Traveler TSTF-505, Revision 2, “Provide Risk-Informed Extended Completion Times – RITSTF [Risk-Informed TSTF] Initiative 4b” (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18183A493).

The NRC staff determined that additional information is needed to complete its review of the LAR. A draft request for additional information (RAI) was provided to G. Stewart (Exelon) by electronic email dated November 14, 2019. A conference call was subsequently held with the NRC on November 21, 2019 to provide clarification of the draft RAI questions. The formal RAI was issued by electronic email to G. Stewart (Exelon) on December 9, 2019 (Reference 5).

As noted in Reference 5, response to the RAI is required by January 13, 2020. The attachment to this letter provides a restatement of the NRC questions followed by our responses.

Exelon has reviewed the information supporting a finding of no significant hazards consideration, and the environmental consideration, that were previously provided to the NRC in Attachment 1 of the Reference 1 letter. Exelon has concluded that the information provided in this response does not affect the bases for concluding that the proposed license amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92. In addition, Exelon has concluded that the information in this response does not affect the bases for concluding that neither an environmental impact statement nor an environmental assessment needs to be prepared in connection with the proposed amendment.

In accordance with 10 CFR 50.91, "Notice for public comment; State consultation," paragraph (b), Exelon is notifying the Commonwealth of Pennsylvania of this supplement to the application for license amendment by transmitting a copy of this letter and its attachment to the designated State Official.

This letter contains no regulatory commitments.

If you should have any questions regarding this submittal, please contact Glenn Stewart at 610-765-5529.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 7th day of January 2020.

Respectfully,

Shannon Rafferty-Czincila
Director - Licensing
Exelon Generation Company, LLC

Attachment: License Amendment Request - Response to Request for Additional Information

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

ATTACHMENT 1

License Amendment Request

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

Response to Request for Additional Information
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."

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A restatement of NRC questions PRA RAI 3.01 and RAI 8.01 followed by our responses is provided below.

PRA RAI 3.01 – Potential Credit for FLEX Equipment or Actions

The NRC memorandum dated May 30, 2017, "Assessment of the Nuclear Energy Institute 16-06, 'Crediting Mitigating Strategies in Risk-Informed Decision Making,' Guidance for Risk-Informed Changes to Plants Licensing Basis" (ADAMS Accession No. ML17031A269), provides the NRC's staff assessment of the challenges of incorporating diverse and flexible (FLEX) coping strategies and equipment into a PRA model in support of risk-informed decision-making in accordance with the guidance of RG 1.200, Revision 2 (ADAMS Accession No. ML090410014).

With regards to human reliability analysis (HRA), NEI 16-06 Section 7.5 recognizes that the current HRA methods do not translate directly to human actions required for implementing mitigating strategies. Sections 7.5.4 and 7.5.5 of NEI 16-06 describe such actions to which the current HRA methods cannot be directly applied, such as: debris removal, transportation of portable equipment, installation of equipment at a staging location, routing of cables and hoses; and those complex actions that require many steps over an extended period, multiple personnel and locations, evolving command and control, and extended time delays. In the May 30, 2017 memo, the NRC staff concludes (Conclusion 11):

> Until gaps in the human reliability analysis methodologies are addressed by improved industry guidance, [Human Error Probabilities] HEPs associated with actions for which the existing approaches are not explicitly applicable, such as actions described in Sections 7.5.4 and 7.5.5 of NEI 16-06, along with assumptions and assessments, should be submitted to NRC for review.

The response to APLA RAI 03.b.i states that credit is taken in the PRA models for FLEX equipment, such as: deploying and aligning the portable FLEX 480V generators; deploying and aligning the portable FLEX pumps; and prolonged Reactor Core Isolation Cooling (RCIC) operation via partial Reactor Pressure Vessel (RPV) depressurization and venting containment using the permanently installed Hardened Containment Vent System (HCVS). The response to RAI 3.b.ii listed the following FLEX operator actions credited in the PRA:

- Success of the FLEX generators includes required operator actions for DC Load Shed, deploy and start the FLEX generators, align the FLEX generators to the battery chargers, and refuel the FLEX generators.

- Success of the FLEX pumps includes required operator actions for aligning the FLEX pumps from the fire water system, aligning the FLEX pumps for RPV injection from the spray pond, and refueling the FLEX pumps.

- Success of prolonged RCIC operation includes required operator actions for performing partial RPV depressurization, opening of the hardened vent at the HCVS panel, aligning the FLEX pumps for suppression pool makeup from the spray pond, and refueling the FLEX pumps.

The NRC staff notes that the actions listed in the RAI response appear to contain actions described in Sections 7.5.4 and Sections 7.5.5 of NEI 16-06 to which the current HRA methods are not, and perhaps cannot, be directly applied.

In RAI 03.d the NRC staff requested the licensee to describe the sensitivity studies that will be used to identify the Risk-Informed Completion Times (RICTs) proposed in this application for which FLEX equipment and/or operator actions are key assumptions or sources of uncertainty. The response to RAI 03.d discussed sensitivity studies on equipment failure probabilities, but no discussion was provided on operator action HEPs.

a) Uncertainty exists in modeling FLEX operator actions and therefore the FLEX operator actions can be key assumptions and sources of uncertainties for RICTs proposed in the application if the credit for FLEX equipment substantively changes the RICT. The guidance in NEI 06-09-A states:

> PRA modeling (i.e., epistemic) uncertainties shall be considered. This [uncertainty] evaluation should include an LCO specific assessment of key assumptions that address key uncertainties in modeling of the specific out of service SSCs. For LCOs in which it is determined that identified uncertainties could significantly impact the calculated RICT, sensitivity studies should be performed for their potential impact on the RICT calculations. […] Insights obtained from these sensitivity studies should be used to develop appropriate compensatory risk management actions.

The NRC SE for NEI 06-09 states:

> TR NEI 06-09, Revision 0, requires sensitivity studies to assess the impact of key sources of uncertainties of the PRA on the RMTS. Where the sensitivity analyses identify a potential impact on the calculated RICT, programmatic changes must be identified and implemented, such as additional [Risk Management Actions] RMAs or program restrictions which would address the impact of the uncertainties, or the use of bounding analyses which address the impact of the uncertainty.

Consistent with the guidance in NEI 06-09-A, investigate and address the source of uncertainty associated with FLEX operator actions as follows:

i. Perform, justify and provide results of LCO specific sensitivity studies that assess impact from the FLEX independent and dependent HEPs associated with deploying and staging FLEX portable equipment on the RICTs proposed in this application. Part of the response include the following:

   1. Justify independent and joint HEP values selected for the sensitivity studies, including justification of why the chosen values constitute bounding realistic estimates.

   2. Provide numerical results on specific selected RICTs and discussion of the results;

   3. Discuss composite sensitivity studies of the RICT results to the operator action HEPs and the equipment reliability uncertainty sensitivity study provided in response to PRA RAI 3.d.

Response

1. Based on the types of scenarios for which credit for FLEX equipment is modeled as described in the previously submitted APLA RAI-03 (i.e., reductions in the SBO and total loss of AC accident sequences when FLEX generators are credited), the LCOs in Table 3-1 were identified as potentially being the most sensitive to assumptions related to the FLEX modeling. The human error probabilities (HEPs) for FLEX components were evaluated with the same methodology used for the human error probabilities in the Limerick PRA models as documented in the Limerick HRA notebook [1]. For the purposes of RICT calculations FLEX HEPs are only used in the context of the FPIE and Fire PRA models. If a seismic or external flooding model was used for RICT calculations it may be appropriate to consider additional uncertainty associated with FLEX HEP timing and success; however, Limerick does not have seismic or external flooding models.

   For this sensitivity, base independent FLEX HEP values associated with portable FLEX equipment were increased by a factor of 10. Some of these independent FLEX HEP values also appeared within joint HEPs in the FPIE PRA model. Joint HEPs that contained independent FLEX HEPs were increased by a factor of 5 in the FPIE PRA model. No independent FLEX HEPs appeared within joint HEPs in the Fire PRA model. These HEP sensitivity values are judged to be sufficiently bounding as the independent value changes alone result in about a 40% chance of failure of aligning the FLEX generators and about a 30% chance of failure of aligning the FLEX pumps. When combined with the equipment reliability sensitivity cases, the aggregate impact represents approximately a 50% likelihood of success of the FLEX equipment.

2./3. The results of the FLEX HEP and equipment sensitivity studies are shown in Table 3-1 below. Three sensitivities were performed for each LCO (FLEX portable equipment failure rates modified, FLEX portable equipment HEP/JHEPs modified, and a combination of the first two sensitivities). A more detailed description of the type of sensitivities can be seen under Table 3-1. Modifying FLEX independent and joint HEP values had a minor impact to the number of RICT days for each LCO.

Table 3-1
FLEX Portable Equipment and HEP Sensitivity Runs for RICT RAI 3.01

TS/LCO Condition	Original RICT Estimate (Days)	Original Reliability Sensitivity Case RICT Estimate(1) (Days)	HEP/JHEP Sensitivity Case RICT Estimate(2) (Days)	Combined Sensitivity Case RICT Estimate(3) (Days)
3.7.1.2.a.3 One emergency service water loop inoperable	30.0	30.0	30.0	30.0
3.8.1.1.d One offsite circuit and one diesel generator inoperable	30.0	30.0	30.0	30.0
3.8.1.1.f One offsite circuit inoperable	30.0	30.0	30.0	30.0
3.8.1.1.g Two offsite circuits inoperable	30.0	28.9	30.0	25.8
3.8.2.1.a.3 Two battery chargers on one division inoperable	30.0	30.0	30.0	30.0
3.8.2.1.c Any battery(ies) on one division of required DC electrical power sources inoperable	15.6	15.5	15.5	15.4
3.8.3.1.a One required AC distribution system divisions not energized	7.5	7.5	7.5	7.5
3.8.3.1.b One required DC distribution system divisions not energized	15.6	15.5	15.5	15.4

(1) Flex pump and FLEX diesel equipment failure rates 5 times base values
(2) Independent FLEX HEPs for portable equipment 10 times base values and joint HEPs containing FLEX HEPs for portable equipment 5 times base values
(3) Independent FLEX HEPs for portable equipment 10 times base values and joint HEPs containing FLEX HEPs for portable equipment 5 times base values and FLEX pump and FLEX diesel equipment failure rates 5 times base values

ii. NEI 06-09, Revision 0-A states that the insights from the sensitivity studies should be used to develop appropriate compensatory RMAs including highlighting risk significant operator actions, confirming availability and operability of important standby equipment, and assessing the presence of severe or unusual environmental conditions.

Describe how the source of uncertainty due to the uncertainty in FLEX operator actions HEPs will be addressed in the RICT program. Describe specific RMAs being proposed, and how these RMAs are expected to reduce the risk associated with this source of uncertainty.

Response

Based on the results of these sensitivity studies, no specific global RMAs were identified related to FLEX HEPs. If FLEX actions are identified as important during a certain plant configuration based on the Real-Time Risk tool (*PARAGON*), configuration-specific RMA candidates would be identified. The previously submitted APLA RAI-05 response describes the process for identifying RMAs based on the Real-Time Risk tool. This includes actions to increase risk awareness and control, such as briefing of crews on risk important operator actions and procedures.

b) Alternatively, to a) above, provide the following discussion of the uncertainties associated with the following items listed in supporting requirements (SR) HR-G3 and HR-G7 of the ASME/ANS RA-Sa-2009 PRA Standard to support detailed NRC review:

i. the level and frequency of training that the operators and/or non-operators receive for deployment of the FLEX equipment (performance shaping factor (a)),

ii. performance shaping factor (f), regarding estimates of time available and time required to execute the response,

iii. performance shaping factor (g) regarding complexity of detection, diagnosis and decision making and executing the required response,

iv. Performance shaping factor (h) regarding consideration of environmental conditions, and

v. Human action dependencies as listed in SR HR-G7 of the ASME/ANS RA-Sa-2009 PRA Standard.

Response

Since a response to PRA RAI 3.01.a is provided above, no response to PRA RAI 3.01.b is required.

PRA RAI 8.01 PRA Modeling of Isolation Actuation Instrumentation

In response to APLA RAI-08.a, regarding PRA modeling of Instrumentation and Controls (I&C), the licensee provided several tables that showed examples of individual components that are specifically modeled for each instrumentation TS function included within the scope of the RICT program. With regards to the containment isolation initiation instrumentation, the response appears to indicate that most of the signals are not explicitly modeled in the PRA, and that a surrogate is being proposed. The response provides the following note in the table:

> "input to high pressure break outside containment initiator; signal contribution will be treated as failed for RICT calculation when out of service"

Explain the statement above, what surrogate is being proposed and how a RICT can be estimated when entering the LCO conditions associated with the isolation signals.

<u>Response</u>

Multiple surrogates will be used when calculating a RICT for TS 3.3.2 as described below.

The first surrogate will indicate to the PRA model that there is a pre-existing large leakage through containment (containment isolation failure). This is bounding as it will lead to much of the calculated core damage frequency to go directly to LERF. This is applicable to both the internal events and internal fire PRA calculations that will be performed for RICT.

The second and third surrogates that will be manipulated for a TS 3.3.2 RICT calculation are related to potential Loss of Coolant Accidents (LOCAs) caused by a failure to isolate. The PRA model contains Interfacing Systems LOCAs (ISLOCAs) as an initiating event to address high to low pressure interface LOCAs. The PRA model also contains a Break Outside Containment (BOC) initiating event to address high pressure piping breaks that could lead to a large LOCA outside containment. The ISLOCA and BOC initiating events will be modified when in a RICT for TS 3.3.2 to indicate that there is failure of containment isolation.

The systems and pathways that makeup the ISLOCA initiator (%VLP) are listed below.

- Core Spray Loop A discharge line
- Core Spray Loop B discharge line
- RHR (LPCI) pump A discharge line
- RHR (LPCI) pump B discharge line
- RHR (LPCI) pump C discharge line
- RHR (LPCI) pump D discharge line
- RHR SDC suction line
- RHR SDC Loop A discharge line
- RHR SDC Loop B discharge line

Each of these systems and pathways are potentially impacted when there is equipment associated with automatic isolation that is inoperable and TS 3.3.2 is entered. The numerical derivation of %VLP comes from Tables 4-2, 4-3, and 4-4 in the ISLOCA notebook [2]. For all these systems and pathways there is an early isolation failure assumed with a probability of 0.2. When a RICT calculation is performed for TS 3.3.2 the early isolation failure value for all systems that contribute to %VLP will be set to 1. The details of how setting the early isolation failure to 1 impacts the final value of %VLP are shown below. Note that a leakage and rupture frequency are developed from the ISLOCA analysis but only the rupture frequency contributes to %VLP. The table below is a combination of Tables 4-2, 4-3, and 4-4 from the ISLOCA notebook with early isolation failure set to 1.

	Interface Failure		**LP Piping Failure**		**Early Isolation Failure (Modified for TS 3.3.2)**	**ISLOCA**		
Pathway	**Failure Mode**	**Freq. (1/yr)**	**Failure Mode**	**Freq. (1/yr)**		**Type**	**Scenario Freq. (1/yr)**	**Initiator Freq. (1/yr)**
CS A (X-16A)	rupture	7.96E-6	rupture	1E-4	1.0	rupture	7.96E-10	7.96E-10
CS B (X-16B)	rupture	9.54E-8	rupture	1E-4	1.0	rupture	9.54E-12	9.54E-12
LPCI A (X-45A)	rupture	7.96E-6	rupture	1.23E-3	1.0	rupture	9.79E-9	9.79E-9
LPCI B (X-45B)	rupture	7.96E-6	rupture	1.23E-3	1.0	rupture	9.79E-9	9.79E-9
LPCI C (X-45C)	rupture	7.96E-6	rupture	1.23E-3	1.0	rupture	9.79E-9	9.79E-9
LPCI D (X-45D)	rupture	7.96E-6	rupture	1.23E-3	1.0	rupture	9.79E-9	9.79E-9
SDC A (X-13A)	rupture	7.96E-6	rupture	1.23E-3	1.0	rupture	9.79E-09	9.79E-09
SDC B (X-13B)	rupture	7.96E-6	rupture	1.23E-3	1.0	rupture	9.79E-09	9.79E-09
SDC Suction (X-16B)	rupture	2.48E-6	rupture	2.92E-2	1.0	rupture	7.24E-08	7.24E-08

	Interface Failure		LP Piping Failure		Early Isolation Failure (Modified for TS 3.3.2)	ISLOCA		
Pathway	**Failure Mode**	**Freq. (1/yr)**	**Failure Mode**	**Freq. (1/yr)**		**Type**	**Scenario Freq. (1/yr)**	**Initiator Freq. (1/yr)**
Total new %VLP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**1.32E-07**

When the early isolation failure is set to 1 for all systems contributing to %VLP, the final value increases to 1.32E-7 from its base value of 2.64E-8, and this is the bounding surrogate value that will be used for RICT calculations.

The impact to the BOC initiating event frequency (%VHP) comes from TS 3.3.2, Line Items (1,3,4,& 5) for Main Steam, RWCU, HPCI, and RCIC. When there is equipment associated with automatic isolation for any of these systems unavailable, the conditional probability of isolation failure for these systems will be set to 1. For Main Steam, these values come from Table 3.3-4 in the initiating events notebook [3]. The calculation of the new value for Main Steam is shown below and is based on modifying Table 3.3-4 of the IE notebook.

DERIVATION OF THE INITIATING FREQUENCY FOR A LARGE LOCA IN THE MAIN STEAM LINES (Modified for TS 3.3.2 RICT)							
Location	**A**	**B**	**C**	**D**	**E** **(B+D)**	**F**	**G** **(E X F)**
	SECTIONS OF PIPE	**LOCA FREQUENCY (PER RX. YR.)**	**NO. VALVES WHOSE RUPTURE WOULD CAUSE LOCA OUTSIDE**	**LOCA FREQUENCY (PER RX. YR.)**	**TOTAL LOCA FREQUENCY (PER RX. YR.)**	**CONDITIONAL PROBABILITY OF ISOLATION FAILURE (Modified for TS 3.3.2 RICT)**	**BREAK OUTSIDE CONTAINMENT WITHOUT ISOLATION (PER RX. YR.)**
Type 1 & 2 In the "break exclusion area" between the containment and outboard MSIVs	4	3.71E-06	4	3.50E-06	7.22E-06	1.0 (Inboard Only)	7.22E-06

DERIVATION OF THE INITIATING FREQUENCY FOR A LARGE LOCA IN THE MAIN STEAM LINES (Modified for TS 3.3.2 RICT)							
Location	**A**	**B**	**C**	**D**	**E** **(B+D)**	**F**	**G** **(E X F)**
	SECTIONS OF PIPE	**LOCA FREQUENCY (PER RX. YR.)**	**NO. VALVES WHOSE RUPTURE WOULD CAUSE LOCA OUTSIDE**	**LOCA FREQUENCY (PER RX. YR.)**	**TOTAL LOCA FREQUENCY (PER RX. YR.)**	**CONDITIONAL PROBABILITY OF ISOLATION FAILURE (Modified for TS 3.3.2 RICT)**	**BREAK OUTSIDE CONTAINMENT WITHOUT ISOLATION (PER RX. YR.)**
Type 3 Outside the outboard MSIV and within the Reactor Enclosure (break exclusion piping)	8	7.43E-06	N/A	N/A	7.43E-06	1.0 (Inboard and Outboard)	7.43E-06
Type 4 Outside the outboard MSIV and within the Turbine Enclosure	40	3.71E-05	N/A	N/A	3.71E-05	1.0 (Inboard and Outboard)	3.71E-05
New total							**5.18E-5**

The %VHP contributions for RWCU, HPCI, and RCIC come from Table 3.3-5 in the initiating events notebook. These values were modified for a potential TS 3.3.2 RICT calculation as shown below. The RWCU and RCIC contributions are assumed to be the same as the HPCI contribution per the IE notebook [3].

HPCI STEAM LINE BREAK OUTSIDE CONTAINMENT INITIATOR FREQUENCY DETERMINATION (Modified for TS 3.3.2 RICT)			
UNISOLATED HPCI STEAM LINE BREAK	**LOCA FREQUENCY (PER YEAR)**	**CONDITIONAL PROBABILITY OF ISOLATION FAILURE (Modified for TS 3.3.2 RICT)**	**INITIATOR FREQUENCY (PER YEAR)**
Types 1 and 2	1.80E-06	1.0	1.80E-06
Type 3	9.29E-06	1.0	9.29E-06
Type 4	1.44E-07	1.0	1.44E-07
New Total			**1.12E-5**

When the conditional probability of isolation failure for these systems is set to 1, %VHP increases to 8.55E-05 from 1.00E-8 and the details are shown below. The feedwater contribution was not modified due to the credited isolation valves being check valves inside containment which do not receive containment isolation signals.

FREQUENCY OF UNISOLATED LARGE BREAKS OUTSIDE PRIMARY CONTAINMENT (modified for TS 3.3.2 RICT)	
System	**Frequency (Per Year)**
Main Steam Line	5.18E-5
Feedwater Line	2.92E-10 (unchanged)
HPCI	1.12E-5
RWCU	1.12E-5
RCIC	1.12E-5
New %VHP Total	**8.55E-5**

Modifying %VLP and %VHP for the purposes of a RICT calculation for TS 3.3.2 will not impact the Fire PRA. Although some fires could lead to spurious valve openings and logic exists in the Fire PRA that models spurious opening of valves that could lead to an ISLOCA or break outside containment, no credit for automatic isolation of these spurious openings is taken (as is appropriate). As such, no increase in risk occurs for the %VLP and %VHP initiating event logic in the Fire PRA when portions of the containment isolation logic are taken out of service. Therefore, the impact on the Fire PRA is limited to the first surrogate which will utilize the very conservative assumption that there is a pre-existing large leakage through containment (containment isolation failure).

All three of the surrogates mentioned above will be used every time a RICT is calculated for TS 3.3.2.

RAI References

[1] LG-PRA-004 Volume 1, Revision 4, Human Reliability Analysis Notebook, 2017 PRA update.

[2] Report No. 467-01-09-4598, Interfacing System Loss of Coolant Accident (ISLOCA) Initiators Evaluation for Limerick Generating Station.

[3] LG-PRA-001, Revision 4, Initiating Events Notebook, 2017 PRA update.

REFERENCES

1. Letter from J. Barstow (Exelon Generation Company, LLC) 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 (ADAMS Accession No. ML18347B366).

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