Exelon Generation®

200 Exelon Way
Kennett Square, PA 19348
www.exeloncorp.com

10 CFR 50.90

January 11, 2018

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

Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Renewed Facility Operating License Nos. DPR-53 and DPR-69
NRC Docket Nos. 50-317 and 50-318

Subject: Response to Request for Additional Information
License Amendment Request to Revise Technical Specifications to Adopt Risk Informed Completion Times TSTF-505, Revision 1, "Provide Risk-Informed Extended Completion Times - RITSTF Initiative 4b."

References:

1. Letter from David Helker (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 1, "Provide Risk-Informed Extended Completion Times - RITSTF Initiative 4b," dated February 25, 2016 (ADAMS Accession No. ML16060A223).

2. Letter from James Barstow (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Supplement - License Amendment Request to Revise Technical Specifications to Adopt Risk Informed Completion Times TSTF-505, Revision 1, "Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b," dated April 3, 2017 (ADAMS Accession No. ML17094A591).

3. Letter from Michael Marshall, U.S. Nuclear Regulatory Commission, to Bryan Hanson, Exelon Generation Company, LLC, "RESPONSE REQUESTED: [Final] RAIs on CCNPP Risk-Informed Completion Time LAR (MF7415 AND MF7416; L-2016-LLA-0001)," dated November 13, 2017 (ADAMS Accession No. ML17304A941).

By letter dated February 25, 2016 (ADAMS Accession No. ML16060A223) (Reference 1), as supplemented by letter dated April 3, 2017 (ADAMS Accession No. ML17094A591) (Reference 2), Exelon Generation Company, LLC (Exelon) submitted a License Amendment Request (LAR) proposing to modify the Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2 Technical Specification (TS) requirements to permit the use of risk-informed completion times (RICTs) in accordance with Technical Specification Task Force (TSTF) Traveler - 505, Revision 1, “Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b.”

The NRC staff reviewed the information provided that supports the proposed amendment and identified the need for additional information in order to complete their evaluation of the amendment request (Reference 3). The NRC letter provided 60 days for the response to request for additional information (RAI).

Attachment 1 to this letter provides a restatement of the RAI questions followed by our responses. Attachment 2 provides a revised set of TS markups in response to the RAI questions which supersedes the previous set of TS markups provided in Exelon's supplement letter dated April 3, 2017 (Reference 2). Enclosure 1 provides a list of revised Required Actions to corresponding PRA functions specific to the electrical TS included in the RICT Program. Enclosure 2 provides supplemental information for the response to RAI 5a.

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.

There are no regulatory commitments in this response.

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

If you have any questions or require additional information, please contact Glenn Stewart at 610-765-5529.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 11th day of January 2018.

Respectfully,

James Barstow
Director - Licensing and Regulatory Affairs
Exelon Generation Company, LLC

Attachments:

1. Response to Request for Additional Information Revise Technical Specifications to Adopt Risk Informed Completion Times TSTF-505, Revision 1, "Provide Risk-Informed Extended Completion Times - RITSTF Initiative 4b."
2. Proposed Technical Specifications Changes (Markups)

Enclosures:

1. List of Revised Required Actions to Corresponding PRA Functions
2. Supplemental Information for Response to Question 5a

cc: USNRC Region I, Regional Administrator
USNRC Project Manager, CCNPP
USNRC Senior Resident Inspector, CCNPP
S. T. Gray, State of Maryland

ATTACHMENT 1

License Amendment Request

Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Docket Nos. 50-317 and 50-318

Response to Request for Additional Information
Revise Technical Specifications to Adopt Risk Informed
Completion Times TSTF-505, Revision 1, "Provide Risk-Informed
Extended Completion Times - RITSTF Initiative 4b."

By letter dated February 25, 2016 (ADAMS Accession No. ML16060A223) (Reference 1), as supplemented by letter dated April 3, 2017 (ADAMS Accession No. ML17094A591) (Reference 2), Exelon Generation Company, LLC (Exelon) submitted a License Amendment Request (LAR) proposing to modify the Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2 Technical Specification (TS) requirements to permit the use of risk-informed completion times in accordance with Technical Specification Task Force (TSTF) Traveler - 505, Revision 1, “Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b.”

The NRC staff reviewed the information provided that supports the proposed amendment and identified the need for additional information in order to complete their evaluation of the amendment request (Reference 3). Below is a restatement of the questions followed by our responses.

RAIs

(1) Fact and Observation 4-21 related to supporting requirement [SR] LE-GS was written because the peer review team could not find documentation on the limitations of the large early release frequency (LERF) analysis that could impact different applications.

Identify the specific limitations in the LERF analysis for this application.

Response

No specific limitations in the LERF analysis have been identified.

In response to F&O 4-21, the LERF results have been reviewed and modeling improvements made to remove LERF conservatisms. Sensitivity analyses have been performed on potential conservatisms and significant uncertainty cases. The dominant LERF cutsets were reviewed to ensure that remaining conservatisms did not skew results. The PRA Uncertainty Assessment Notebook was updated to document the review and any limitations. The updated analysis has been reviewed for specific limitations of the LERF analysis that could impact the TSTF-505 application, and no specific limitations in the LERF analysis have been identified.

(2) The LAR references a tornado methodology reviewed by the NRC staff as described in a letter from the NRC dated May 1, 1995 (ADAMS Accession No. ML 17304A020). LAR Enclosure 4, Section 4, explains that bounding core damage frequency (CDF) values for tornado-generated missile events of less than SE-06/year and bounding LERF values of less than SE-07/year were calculated for Calvert Cliffs, Units 1 and 2. The most limiting CDF and LERF increases associated with structures, systems, and components (SSCs) unavailability are applied to the risk-informed completion time (RICT) evaluations, except for five TS limiting conditions for operation (LCOs) conditions. In the revised Enclosure 4 submitted in the supplement dated April 3, 2017, the licensee states in Section 4 that for the five conditions:

> ... additional analyses or restrictions will be required during RICT implementation, in the unlikely event a RICT evaluation is performed for any of those LCOs. For example, entering an extended completion time may be precluded during time periods with severe weather forecasts, or a bounding penalty factor may be applied.

a. The letter dated May 1, 1995, referenced a methodology for "evaluating the need for tornado-generated missile barriers." It appears that this referenced approach only considered exposed emergency diesel generator (EOG) components and it does not consider the scope of SSCs within the RICT program.

Estimating extended completion times is a different application than evaluating the need for barriers. Therefore, justify that the proposed approach for estimating the tornado risk in the RICT program is bounding and accounts for various uncertainties such as plant configuration, variations in missile distribution around the site, seasonal changes in tornado frequencies, etc. Alternatively, provide a bounding or conservative estimate using other qualitative or quantitative approaches to quantify or justify screening the risk associated with tornadoes.

Response

A penalty factor of 5E-6/year and 5E-7/year for CDF and LERF respectively, which reflects several conservatisms as described below, is used in screening the risk associated with tornadoes. This is considered to represent a bounding mean estimate for purposes of RICT calculations.

Since the approval of the methodology in the 1995 referenced letter, the methodology has been applied to other SSCs at CCNPP, including several of those considered in the RICT program. The current licensing basis, as reflected in the UFSAR, is based on a similar tornado missile model, but uses the site-specific PRA to estimate the risk associated with exposed SSCs with greater level of detail than the original analysis in 1995. Table 5A-5 of the UFSAR shows that the CDF due to SSCs exposed to tornado missiles is less than 5E-7/year.

The PRA model used to support Table 5A-5 of the UFSAR includes the potential for all exposed SSCs to be failed by tornado missiles, as well as random failures and maintenance alignments. The PRA integrates the effect of tornado missile failures to estimate CDF and LERF. Since specific configurations can be evaluated in the PRA, it is reasonable to conclude that the current model is adequate for estimating the tornado missile risk while SSCs are unavailable.

The PRA model used to support Table 5A-5 of the UFSAR is not used to directly calculate the risk of each specific configuration that could be potentially encountered in the RICT program. Rather, it is used to determine a conservative increase in tornado risk due to SSCs being unavailable. The results are used to provide a penalty factor (an increase in CDF) that applies to all RICT calculations, even when there is only a negligible, or no, increase in tornado risk as a result of the configuration. The PRA model used to develop the penalty factor is the same as the licensing basis model, with the exception that an increased tornado frequency is used. A conservative tornado frequency is used for the penalty factor determination, more than twice the frequency used for the UFSAR calculations, as noted below.

Additional factors, such as missile distribution around the site, are accounted for in the conservative analysis of tornado missile-induced failure probabilities. The methodology

does not have the granularity to distinguish the impact of specific missile distributions throughout the site and their impact on target hit and damage probabilities. However, target damage probability and frequency are relatively conservative as compared to similar targets at other sites, as determined by TORMIS simulations; further details are provided in the table below in response to part b. of this question. There is no intent to account for seasonal variations in tornado frequency. As a point of reference, neither RG 1.200 nor the current PRA standard (ASME/ANS RA-Sb-2013) provide any requirements for seasonal based wind hazard analyses (WHA).

The tornado hazard frequency used in this application includes the following conservatisms.

- The primary conservatism is that the tornado frequency is calculated for tornadoes of any speed greater than or equal to 65 mph. At wind speeds below approximately 100 mph, it is unlikely that tornado missiles of any consequence to nuclear power plant SSCs are created. However, no distinction in wind speed is made in the calculation of tornado missile risk; all tornado wind speeds are considered in the frequency of SSCs being damaged by tornado missiles.

- Three sets of tornado frequencies are provided in NUREG/CR-4461, Rev. 2 (Reference 4) for the region around CCNPP (so-called 1°, 2°, and 4° boxes). The highest mean frequency for CCNPP is for the 2° box, in Appendix A. This is the value used for the tornado frequency for the bounding calculation.

As a sensitivity, the 95th percentile values provided in NUREG/CR-4461 for the 1°, 2°, and 4° boxes surrounding CCNPP were also examined. The 95th percentile values from the 2° box are the highest. If the 2° box 95th percentile tornado frequencies were used, the calculated increase in tornado CDF would be 1.4 times higher than the increase using mean values. Thus, the increase in tornado CDF would go from 3.0E-6/year to 4.2E-6/year for Unit 1 and from 4.3E-6/year to 6.0E-6/year for Unit 2. Therefore, it is concluded that the penalty factor of 5E-6/year, which reflects several conservatisms as described above, can be considered to represent a bounding mean estimate for purposes of RICT calculations.

b. The LAR states that certain unprotected SSCs are assumed to fail during a tornado event with a probability of 1.0, and other unprotected SSCs are assumed to fail based on a calculated missile strike probability. It also appears that there is another group of SSCs (e.g., main steam safety valves and atmospheric dump valves vent stacks) that are assumed to be hit but not failed.

   Explain how the generic GDF increase estimates of 3.0E-6/year for Unit 1 and 4.3E-6/year for Unit 2 are calculated by discussing the adjustment performed in the probabilistic risk assessment (PRA) model to estimate the risk of tornado events and the basis for assigning failure rates to different SSCs. Justify why the estimated generic GDF increase is considered bounding for all possible plant configurations expected during the application of a RICT. Alternatively, provide a bounding or conservative estimate of the tornado risk using other quantitative or qualitative approaches to quantify or justify screening the risk associated with tornadoes.

Response

As stated in the RAI, failure probabilities for exposed SSCs are binned into three categories in the PRA:

- Assumed to fail during a tornado event with a probability of 1.0. Examples include the 0C diesel generator (DG) and the switchgear heating, ventilation and air conditioning (HVAC) system.
- Failure based on missile strike probability. This includes most targets, such as EDG exhaust stacks, turbine driven auxiliary feedwater (TD AFW) exhaust pipes, service river water (SRW) expansion tank, etc.
- Failure based on missile strike probability, accounting for an estimated failure probability given a tornado missile strike. This is only applied to the array of 16 main steam safety valves (MSSVs) and 2 atmospheric dump valves (ADVs) on the Auxiliary Building roof. A tornado missile strike to any part of the array of 16 MSSV and 2 ADV vent stacks is assumed to have a 1 in 10 chance of crimping enough stacks to fail the steam generator decay heat removal function. This is conservative, considering that the number of valves is much greater than the number required for decay heat removal, the spacing of the exhaust pipes, their size, and the fact that they are elevated, reducing the likelihood that large energetic missiles would strike the targets.

The SSC missile-induced failure frequencies used for the tornado missile penalty factor are provided in the table below. For comparison purposes, failure frequencies for similar components at two other plants with TORMIS analyses, are provided, based on TORMIS failure probabilities from Appendix A of NEI 17-02, Rev. 1 (Reference 5). The comparison values are taken from Tables A-3, A-6, and A-7 of NEI 17-02, and were multiplied by the tornado frequency for CCNPP to provide a meaningful comparison. As seen from this table, comparable SSCs at other sites have lower failure frequencies (based on TORMIS simulation results), than are used in the CCNPP analysis. This provides indication that the failure frequencies used in the CCNPP tornado missile analysis are conservative.

Target	Area (sq. ft.)	Damage Frequency (/year)
Calvert Cliffs Targets		
Condensate Storage Tank (CST) (11 or 21)	3000	6.8E-06
Fuel Oil Storage Tank (FOST) 11	2900	6.5E-06
Refueling Water Storage Tank (RWST)	6200	1.4E-05
Emergency Diesel Generator (EDG) (1B, 2A, or 2B)	530	2.7E-06
Turbine Driven Auxiliary Feedwater (TD AFW) Exhaust Pipe	123	6.5E-07
2 Atmospheric Dump Valve (ADV) Exhaust Pipes	58	3.0E-07
16 Main Stem Safety Valves (MSSV) + 2 ADV Exh Pipes	430	2.2E-07 [1]
Intake Structure Hatches	485	2.5E-06

Target	Area (sq. ft.)	Damage Frequency (/year)
Service River Water (SRW) Tank	698	3.5E-06
NEI 17-02 TORMIS Targets		
Plant X CST	3200	1.2E-06
Plant Y RWST	3800	2.2E-07
Plant Y EDG A	150	1.4E-08
Plant X TD AFW Exhaust Pipe	315	5.0E-07
Plant Y SG PORV and Exhaust Pipe	65	1.2E-07
Plant X Pump House Roof	750	8.7E-09
Plant X Service Water Piping	470	1.7E-09

Notes:
1 – This damage frequency includes a factor of 0.1, to account for the very low likelihood that a missile strike will crimp enough of the exhaust pipes to prevent adequate SG heat removal. Without this factor, the damage frequency would be 2.2E-6/year.

For these reasons, and those stated in the response to part a. of this RAI, CDF and LERF penalties of 5E-6/year and 5E-7/year, respectively, due to tornado missiles, are considered conservative. To place the CDF penalty in perspective, consider the following:

1. The mean frequency of a tornado striking CCNPP with wind speeds greater than 100 mph is approximately 6E-5/year, based on the data provided in Table 6-1 of NUREG/CR-4461 Rev. 2 (Reference 4). 100 mph is chosen as the wind speed at which tornado missiles could be generated with the possibility of damaging components such as EDG exhaust stacks, AFW steam exhaust stacks, MSSV exhaust stacks, and tanks. In fact, this is a low wind speed estimate for failures of many such SSCs, since most targets are elevated and missiles that could damage those targets (e.g., utility poles) are unlikely to be elevated or travel at a sufficient speed to damage such equipment.
2. The most damaging tornadoes (EF4 and EF5) are relatively rare in the vicinity of Calvert Cliffs. The 10^{-6}/year exceedance frequency wind speed is 167 mph (per Table 6-1 of NUREG-4461, Rev. 2).
3. If a conservative assumption is made that the Conditional Core Damage Frequency (CCDP) for tornado wind speeds greater than 167 mph is 1.0, when any equipment is unavailable, then:
    - This would result in a CDF of 1E-6/year, for wind speeds greater than 167 mph.
    - Conservatively assume the 1E-6/year CDF is a ΔCDF (i.e., the base tornado risk with all equipment available is 0).
    - Therefore, 4E-6/year of the planned penalty factor (5E-6 planned - 1E-6 due to wind speeds above 167 mph) would be from tornado strikes between 100 – 166 mph.

- Given the frequency of all tornadoes between 100 – 166 mph is approximately 6E-5/year (6E-5/year – 1E-6/year ~ 6E-5/year), the CCDP would need to be about 7E-2, in order for the CDF to be 4E-6/year (conservatively assuming CDF = ΔCDF).
- TORMIS data from Tables A-3, A-6, and A-7 of NEI 17-02 shows that the damage probability given missile strikes from F'2 and F'3 tornadoes (equivalent to EF2 and EF3 tornado wind speeds) are very low. Some examples are:

Tornado Missile Target	Damage Probability for F'2/EF2	Damage Probability for F'3/EF3
Tanks (RWST, CST)	6.0E-5 to 7.0E-4	3.7E-4 to 3.0E-3
EDG stacks	2.6E-5	2.5E-4
TD Exhaust Pipe	0	3.4E-6
SG PORV and Exhaust Pipe	1.4E-3	2.5E-3

All the individual target missile damage probabilities are less than 1E-2 for these lower speed tornadoes. Therefore, given a tornado with wind speeds less than 166 mph, the CCDP due to tornado missiles is expected to be less than 1E-2, even with equipment unavailable.

Therefore, using realistic tornado hazard frequencies and assuming conservative CCDPs, it is shown that the 5E-6/year penalty factor for ΔCDF is conservative. This is expected, given the conservative nature of the analysis used to estimate the tornado missile risk associated with unavailable SSCs. Particularly, the conservative tornado strike frequency used, and the fact that a majority of the tornado hazard frequency is associated with low wind speed tornadoes, that have a small likelihood of generating damaging missiles.

c. Explain what additional analyses would be performed and what circumstances or criteria would trigger the need for additional analyses or restrictions for the five LCO conditions excluded from the tornado RICT evaluations.

Response

Upon entering the LCO, for the applicable tornado RICT evaluations, a higher penalty factor will be applied in lieu of performing additional analysis.

This question refers to the five LCOs listed on page E4-8 of the April 3, 2017 supplement to the TSTF-505 LAR. Specifically, they are:

- 3.3.4.B Two ESFAS Modules or Measurement Channels Inoperable
- 3.7.4.A CST inoperable (CST 12 only)
- 3.8.4.A One Battery Inoperable and Reserve Battery Available
- 3.8.4.B One DC Channel Inoperable
- 3.8.9.C One DC Distribution Subsystem Inoperable (Bus 11/21 only)

LCO 3.7.4.A CST inoperable is being deleted from the RICT Program in response to RAI 7. Per Table E1-2, the RICT for LCO 3.3.4.B is limited by its front stop, so the additional risk from tornado missiles would not change the RICT. The other three LCOs have relatively short RICTs based on the risk from internal and/or fire events. The tornado missile risk is at least 100 times less than the CDF/LERF from the sum of internal and fire events. Therefore, the additional risk will have a small to negligible impact on the RICT. However, in order to account for uncertainties associated with the tornado missile risk for these configurations, CDF and LERF penalty factors of 5E-5/year and 5E-6/year, respectively, will be applied in the calculation of the RICT for any of these five LCOs. This is a factor of 10 higher than the normal penalty factor, and nearly 2 times the tornado missile risk with CST 12 unavailable, which has the highest CDF and LERF from tornado missiles (3E-5/year and 2E-6/year, respectively).

(3) Enclosure 4 states that the baseline 1.1 E-6/year seismic GDF contribution and corresponding seismic LEAF contribution will be added to the configuration specific delta GDF and delta LEAF from the internal and fire initiating events contributions. The LAR clarifies that the baseline seismic PRA risk conservatively assumes that all SSC seismic induced failures are correlated (i.e., if one train fails all trains fail). The LAA further states that:

> ... if one were to assume no correlation at all in the seismic failures, then the [baseline] seismic risk would be lower than the risk predicted by a fully correlated model, but the change in risk using the uncorrelated model with a redundant piece of important equipment out of service would be equivalent to the level predicted by the correlated model.

Assuming full correlation between SSCs, the LAR continues that:

> ... the conditional core damage frequency given a seismic event will remain unaltered whether equipment is out of service or not. Thus, the risk increase due to out of service equipment cannot be greater than the total SCDF [seismic core damage frequency] estimated by the bounding method ...

For the SSCs within an LCO during an extended RICT, full correlation will not result in any seismic contribution to change the RICT because seismic-induced failure would fail all operable and inoperable SSCs. However, it is unclear why full correlation among SSCs not within the LCO could not contribute greater than the baseline seismic risk because those SSCs will be at risk of failure from a seismic event but would otherwise be operable. The importance of the SSCs not within the LCO might be increased by the inoperable SSCs within the LCO.

Clarify how the proposed approach, of adding the baseline seismic risk to the configuration-specific internal and fire risk increases, appropriately captures any configuration-specific seismic risk increase for the RICT calculation.

Response

There is no configuration-specific seismic model or basis for assessment available, and as a result the bounding seismic penalty approach has been applied.

As noted in Enclosure 4 of Reference 1, there is not a current RG 1.200 Rev. 2 compliant seismic PRA model available for CCNPP. For this reason, available information regarding the limiting (low) high confidence of low probability of failure (HCLPF) potentially leading to core damage or large early release has been used to estimate a seismic CDF and seismic LERF. This process combines this limiting HCLPF with the re-evaluated seismic hazard for CCNPP, assuming that failure of the limiting HCLPF component always leads to core damage.

There are several sources of conservatism inherent in this approach. One is that the seismic contribution to delta risk for the RICT calculation for any configuration is taken as the full seismic plant CDF / LERF. That is, for the purpose of any RICT calculation, delta-seismic CDF is assumed to be equal to the estimated seismic CDF from the convolution of the seismic hazard curve with the limiting HCLPF. A related conservatism is that the full annual seismic frequency is applied to the seismic contribution for all RICT calculations, regardless of the duration of the RICT. Since the maximum duration for a RICT is limited to the 30-day backstop, the estimated seismic CDF is roughly 12 times the contribution applicable during any RICT. The presumption of the limiting HCLPF leading directly to seismic core damage means that any other failures, whether related to components in an LCO or not, and whether treated as correlated or not, are not required for the calculation of seismic CDF (i.e., their HCLPFs would be greater than or equal to the limiting HCLPF), and these would not increase the estimated seismic CDF (which is conservatively treated as seismic delta CDF for the RICT calculations).

In other words, full correlation among SSCs not within the LCO would not contribute to the Delta CDF greater than the baseline seismic risk. The Delta CDF associated with SSCs within the LCO is calculated based on the limiting HCLPF, which can be used a surrogate for the potential risk increase of the SSCs not within the LCO (i.e., the HCLPF of the SSCs not within the LCO would have HCLPFs greater than or equal to the limiting HCLPF).

(4) LCO 3.8.1.c specifies constraints regarding power supply to the control room emergency ventilation system (CREVS) and control room emergency temperature system (CRETS), requiring that the opposite unit's offsite circuit and EOG that supply power to the CREVS and CRETS be operable. Condition 3.8.1.G is in the scope of the RICT program. This condition applies to one required LCO 3.8.1.a offsite circuit that provides power to the CREVS and CRETS inoperable and the required LCO 3.8.1.c offsite circuit inoperable.

The LAR does not describe how the CREVS and CRETS systems are modeled in the PRA. Unavailable equipment that is excluded from the PRA but affects the functionality can result in an over-estimate of the RICT.

a. Explain how the CREVS and CRETS systems are modeled in the PRA.

Response

Equipment that is used to recirculate the air within the control room envelope is shared between CREVS and CRETS. CREVS equipment that is used to recirculate the air within the control room envelope, such as fans and dampers, are included in the PRA in support of the CRETS function. CREVS-only components, such as post-LOCI

(Loss-of-Coolant Incident) filters, are not included. The CREVS function is not explicitly modeled in the PRA as it does not directly mitigate a core damage or large early release event. If radiological controls are needed, then it is presumed that a release has already occurred, and thus would not impact CDF or LERF calculations.

A non-safety related chiller system is also modeled to support the control room HVAC system.

b. Describe how the inoperability of the power supplies to the CREVS and CRETS systems impacts the risk estimates.

Response

The power supplies to CREVS and CRETS are modeled in the PRA. The power supplies include one power supply from each unit powered from offsite sources with diesel generator backup. Loss of power to the CREVS/CRETS system would fail the Control Room HVAC function modeled in the PRA. The cascading impact on the loss of CR HVAC is described in question c. below.

c. Describe and justify how any cascading impacts on other systems that may result from inoperability of CREVS and CRETS are captured in the risk estimates.

Response

Loss of control room envelope cooling can affect the operability and availability of equipment in the control room and the cable spreading room. Loss of this function is modeled to have the effect of increasing the failure rate of 120VAC and 125VDC instruments and controls in the cable spreading room. For the control room, degradation of the 125VDC system is used as a conservative surrogate for control room instrumentation degradation.

An analysis was performed to show that loss of Control Room HVAC system is not expected to cause abandonment by operation staff of the control room due to high temperature, over the PRA mission time.

(5) The NRC Final Safety Evaluation (SE) for Topical Report (TR) Nuclear Energy Institute (NEI) 06-09, "Risk-Managed Technical Specifications (RMTS} Guidelines" (ADAMS Accession No. ML071200238), approved and provided limitations and conditions for use of the TR. Section 4.0, Item 6, of the SE requires that the licensee provide the plant-specific total CDF and LERF to confirm that these are less than 1 E-4/year and 1 E-5/year, respectively. This is consistent with the risk acceptance guidelines in Regulatory Guide (RG) 1.17 4, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis" (ADAMS Accession No. ML 100910006). The LAR makes several commitments to complete certain plant modifications and actions prior to implementation of the RICT program. LAR Attachment 5 lists National Fire Protection Association (NFPA) 805 plant modification commitments that resolve fire protection issues and states that Calvert Cliffs will implement the modifications "prior to use of the RICT Program on each unit." LAR Enclosure 9 explains that calculation of some pipe break frequencies in the internal flooding PRA was based on an older method than other

break frequencies in the internal flooding PRA and identifies this as a key source of uncertainty. An entry in LAR Enclosure 9, Table E9-1 states, "Prior to implementation of the RICT program, the internal flood model will be updated so that the model consistently uses the newer methodology."

The NRC staff considers the following as potential implementation activities:

- Complete NFPA 805 plant modification commitments that resolve fire protection issues as discussed in Attachment 5 of the LAR.
- Update pipe break frequencies in the internal flooding PRA as discussed in Enclosure 9 of the LAR.
- Confirm that the total CDF and LERF are less than 1 E-4/year and 1 E-5/year, respectively.

a. Provide a list of activities (i.e., implementation items) that are credited as part of the approval of the request to implement a RICT program that needs to be completed before implementation of the RICT program.

Response

At the time of submittal, the following credited activities were stated as planned to be completed before implementation of the RICT program:

1. On a per unit basis, installation of the plant modifications necessary to reduce internal fire risk, as described in Attachment 5 of the LAR.
2. Update of the pipe rupture frequencies in the internal events/internal flooding model, as described in Table E9-1 of Enclosure 9 of the LAR.
3. Using the updated baseline risk models from activities 1 and 2 above, perform a confirmation that the plant-specific total CDF and LERF remain less than 1E-4/year and 1E-5/year, respectively. The activity will be performed consistent with the analysis provided in Enclosure 5 of the LAR.

These items have now been completed as described below:

1. All committed NFPA 805 physical modifications have been completed.

2. The update of pipe rupture frequencies of activity 2 has been completed. This was determined to represent a PRA model upgrade. The upgrade involved an industry methodology new to the Calvert PRA model. A focused-scope peer review was conducted on this model upgrade in January 2017. The focused-scope peer review was conducted against ASME/ANS RA-Sa-2009 – Addenda to ASME/ANS RA-S-2008, *Standard for Level1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications*. The focused-scope peer review was performed using the process in NEI 05-04, Rev. 3, *Process for Performing Internal Events PRA Peer Reviews Using the ASME/ANS PRA Standard*. An updated assessment consistent with Enclosure 2 of the LAR and addressing the results of the January 2017 focused-scope peer review concludes that the CCNPP internal events PRA, including internal

flooding, continues to be of adequate technical capability to support the TSFT-505 program. The finding from the January 2017 focused-scope peer-review is included in a table in Enclosure 2. The table includes the status of disposition of that finding, and an assessment concluding that there is no impact on the CCNPP RICT program.

3. It has been confirmed that the updated plant-specific total CDF and LERF remain less than 1E 4/year and 1E 5/year, respectively, using the updated baseline risk models reflecting activities 1 and 2 above and consistent with the analysis provided in Enclosure 5 of the LAR.

b. Describe the mechanism(s) to ensure that the activities (i.e., implementation items) provided in response to RAI Sa will be completed before implementation of the RICT program.

Response

The items in part a. above have been completed, and therefore, do not require any mechanism to ensure the activities are completed.

(6) LAR Enclosure 8 describes the process that will be used to translate the baseline PRA models into the configuration risk management program (CRMP) models to be used in the RICT program. The description implies that the CRMP model has not yet been developed and, furthermore, the translation process itself does not appear to be fully developed. Specifically, some expected adjustments or changes to the baseline model are not identified, such as:

- integration of the internal events, internal flooding, and fire PRA models;
- use of a plant availability factor for determining the average annual risk that would not be applicable to configuration-specific risk;
- adjustments to allow user-specified configurations (e.g., train alignments) that apply to specific configurations that are different from the average configurations modeled in the PRA;
- accounting for the bounding seismic and tornado-generated missile risk contributions; and
- modeling of equipment that is in the RICT program but not in the PRA, such as containment airlocks.

a. Summarize the translation process. Include discussion of the five modeling adjustments cited above.

Response

The RICT CRMP model is developed in a manner similar to the current Maintenance Rule (a)(4) on-line risk assessment model. The current on-line risk assessment model does not include Fire PRA modeling, which will be included in the RICT model.

- The internal events and internal flooding PRA models are integrated into a single fault tree model. The fire PRA model is a separate model based upon the internal

events model, but with changes to reflect responses to fires, such as added fire initiators, fire human actions, and hot-short split-fraction events. In the RICT CRMP model, the fire PRA and the internal events/internal flood CDF and LERF results will be calculated separately, then the results are combined with the fixed contributions from Seismic and high winds.

- The base fault tree model contains a capacity factor basic event. Consistent with the Maintenance Rule (a)(4) model, this event is set to '1' for the on-line risk assessment model.

- The base fault tree model contains test/maintenance events to represent the fraction of time a train or component is out-of-service for maintenance. Consistent with the Maintenance Rule (a)(4) model, these events are set to '0' to create a 'zero-maintenance' model. These events, or surrogates, are then adjusted to '1' (true) to reflect the specific plant configuration model. In addition, the base fault tree model contains equipment/train 'alignment' events. In the base model, these alignment events are set to their average alignment (e.g., pump A is in service 50% of the time). Depending on the specific plant configuration being modeled, these average alignment events are adjusted to '0' or '1' based on the actual plant configuration.

- The CRMP model will include the bounding delta-CDF/LERF values for the respective seismic and tornado-generated missile risk contributions, and these contributions will be combined with the configuration-specific internal events and fire model results.

- Where applicable, the surrogate event(s) as described in Enclosure 1 of the LAR (Reference 1) are used for the RICT calculation. Those events are set to true/failed in the same way as the events for an explicitly modeled component or train, and the plant configuration evaluated and the RICT and RMAT determined.

b. Summarize all changes made to the baseline PRA model to produce the CRMP model and how it is assured that these changes are appropriate and comprehensive.

Response

As noted in the response to 6a, the RICT CRMP PRA model will be built in a manner similar to the Maintenance Rule (a)(4) on-line risk model. The current on-line risk model currently includes internal events and internal flood initiators. The RICT CRMP model will also include fire PRA.

The following changes are made to the baseline PRA model:

- The capacity factor basic event, "RCF," is set to 1.0.
- Test and Maintenance Events are set to 0.00, to create the 'zero-maintenance' model.
- The base fault tree is restructured to improve performance speed. The changes are reviewed and quantified to assure model fidelity is maintained.

The same changes are made to the Fire PRA model.

As part of the model rollout, the updated RICT CRMP model is re-quantified for each functional equipment group out-of-service, and then the results are reviewed, by a qualified analyst, to assure the results are appropriate, and any unexpected results are dispositioned.

(7) In the letter dated April 3, 2017, the licensee supplemented its original LAR to remove from the list of requested TS changes those TS actions related to loss of function. Loss of function conditions are those TS conditions with insufficient TS operable equipment to meet the specified safety function of the system.

Based on the design success criteria listed in LAR Table E1-1, it appears that the following LCO conditions represent a loss of function:

- 3.4.1 10.A, "One pressurizer safety valve inoperable"
- 3.4.11.B, "One PORV inoperable and not capable of being manually cycled"
- 3.4.11.C, "One block valve inoperable"
- 3.4.11.D, "Two PORVs inoperable and not capable of being manually cycled"
- 3.4.11.E, "Two block valves inoperable"
- 3.6.6.B, "One or more penetration flow paths with two containment isolation valves inoperable" (only applicable to penetration flow paths with two containment isolation valves and not a closed system)
- 3.6.6.D, "Two containment cooling trains"
- 3.7.2.A, "One MSIV inoperable in mode 1"
- 3.7.4.A, "CST inoperable"
- 3.7.15.A, "One or more MFIVs inoperable"

Additionally, based on descriptions in the TS Bases, it appears that the following LCO condition represents a loss of function:

- 3.5.1.B, "One SIT inoperable for other reasons than boron."

For this condition, the TS Bases state that three safety injection tanks (SITs) are required to reach the core during a loss-of-coolant accident (LOCA) and that the design-basis analysis assumes that the contents of one tank spills through the break. Therefore, one inoperable SIT would be a loss of function. The TS Bases further state that "if the contents of fewer than three tanks are injected during the blowdown phase of a LOCA, the ECCS acceptance criteria[...] could be violated."

For each of the 11 LCO Conditions listed above, either:

a. Confirm and describe how all design-basis functions are met when entering any of the conditions listed above;

b. Remove the proposed RICT; or

c. Compare the design-basis success criteria parameter values with the PRA success criteria parameter values, explain how the RICT is consistent with the new constraint

proposed in TS 5.5.18.d, and justify how defense in depth and safety margins are maintained if the design basis will not be met during the RICT.

Response

A proposed RICT will be removed from the following LCO Conditions as identified above:

- 3.4.10.A, "One pressurizer safety valve inoperable",
- 3.4.11.B, "One PORV inoperable and not capable of being manually cycled",
- 3.4.11.C, "One block valve inoperable",
- 3.4.11.D, "Two PORVs inoperable and not capable of being manually cycled",
- 3.4.11.E, "Two block valves inoperable",
- 3.5.1.B, "One SIT inoperable for other reasons than boron".
- 3.6.3.B "One or more penetration flow paths with two containment isolation valves inoperable" (only applicable to penetration flow paths with two containment isolation valves and not a closed system),
- 3.6.6.D, "Two containment cooling trains",
- 3.7.2.A, "One MSIV inoperable in mode 1",
- 3.7.4.A, "CST inoperable",
- 3.7.15.A, "One or more MFIVs inoperable".

Note that the question indicates 3.6.6.B but this should be 3.6.3.B as listed in the above response. See the attached revised TS markups in Attachment 2 (note that a full set of revised TS markups is provided for completeness which supersedes the set of TS markups provided in Exelon's supplement letter dated April 3, 2017 (Reference 2)).

(8) Instrumentation is generally not modeled in detail in PRAs and is often modeled as a single, generic basic event representing all trains or channels. The LAR did not provide discussion on the PRA modeling for many of the LCO conditions pertaining to instrumentation that are proposed in the scope of the RICT program, or provided only a brief summary for others.

a. For each condition in TS 3.3 proposed in the scope of the RICT program, describe how it is modelled in the PRA. If the TS condition/TS Required Action covers multiple functions, such as in the case of engineered safety features actuation system instrumentation, describe each one individually. If there are different types of models (e.g., multiple channel basic events versus a single combined basic event) that are used for different instrumentation, explain all the different models.

Response

RPS Instrumentation (LCOs 3.3.1/3.3.3)

The CCNPP RPS PRA system fault tree modeling is detailed. The fault tree model includes the four RPS bistable trip units and associated instrument measurement channels. A basic event represents when an individual RPS trip channel is in bypass.

Each trip path includes six logic matrix relays. These relays are modeled separately.

The four trip path relays, K1 through K4, are modeled. When these relays are de-energized (i.e., tripped), it trips two trip circuit breakers (TCBs). The eight trip circuit breakers are modeled separately. The TCB trip configuration logic is modeled consistent with plant design to result in depowering the Control Element Drive Mechanisms (CEDMs).

Manual trip is also modeled. Actuation of the two adjacent pushbutton switches on the control panel causes trip circuit breakers to open resulting in depowering of all CEDMs.

ESFAS Instrumentation, Including Diesel Start (LCOs 3.3.4/3.3.5/3.3.6)

The CCNPP ESFAS PRA system fault tree is modeled in detail for the ESFAS actuation functions:

- Safety Injection Actuation Signals
- Containment Spray Actuation Signals
- Containment Isolation Signals
- Shutdown Sequencer Signals
- Recirculation Actuation Signals
- Steam Generator Isolation Signals
- Undervoltage blocking and sequencing signals
- Auxiliary Feedwater Actuation Signals

The model includes the four sensor modules and associated instrument measurement channels for the actuation functions. For example, for a undervoltage trip signal, the bus UV relays are modeled. Basic events represent when a sensor channel is in bypass. Basic events are used to represent blocking logic failures for applicable signals.

The model includes detailed modeling of the two ESFAS actuation channels. The modeling includes actuation relays, modules, and power supplies.

Where provided, manual initiation of the actuation channel is modeled.

Loss of voltage to the 4KV busses is modeled, the UV sensor modules are modeled, and a UV signal is modeled for each of the site's four safety-related diesel generators. Isolation of the 4KV applicable bus is modeled (failure of a required breaker to open or close as needed fails the diesel generator function to that bus). The diesel start function is also modeled explicitly.

b. Clarify how each of the models will be changed to model the impact of an inoperable channel and justify why the modelling is correct or will conservatively bound the RICT calculation.

Response

Because the channels are explicitly modeled, they are set to ‘failed’ in the PRA models for the RICT calculation. This is the same as the approach for other explicitly modeled components. Because the channels are explicitly modeled there is no need to consider whether the calculation is bounding.

(9) In addition to consideration of risk-significant SSCs, LAR Enclosure 12, Section 3, states that "several areas of uncertainty in the internal events and fire PRAs will be considered in defining configuration-specific risk management actions (RMAs) when entering a RICT." LAR Enclosure 9 identifies two fire event uncertainty issues: configurations in which automatic fire suppression in the cable spreading room or switchgear room are important and configurations in which transient combustibles and hot work are important. LAR Tables E9-1 and E9-4 also identify modeling of human failure events as a key uncertainty that requires RMAs. Table E9-4 indicates that uncertainty will be addressed during the development of RMAs. Enclosure 12 discusses the development of RMAs. This enclosure repeats the guidance in NEI 06-09, Revision 0-A, "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines" (ADAMS Accession No. ML 12286A322), that RMAs are required when the risk management action time (RMAT) thresholds will be, or are, exceeded. Enclosure 12 also states that "Enclosure 9 identifies several areas of uncertainty in the internal events and fire PRAs that will be considered in defining configuration-specific RMAs when entering a RICT."

a. Please provide an overview of the procedure or process for developing configuration-specific RMAs for each RICT.

Response

As described in Enclosure 12 of Reference 1, RMA development for a particular RICT addresses the three areas noted in NEI 06-09-A. The CCNPP protected equipment program identifies equipment that should be protected to ensure that the minimum required equipment remains available to support the plant. Protected equipment is clearly posted to limit work on or manipulation of the protected equipment. This would include, for example, the remaining train of a 2-train system, or that train’s required support systems such as power or cooling. The RMAs arising from consideration of fire risk in online maintenance will be included in the RICT RMAs. These minimize potential initiators whose mitigation is impacted by the out-of-service equipment. The PRA results for the RICT will be used to determine whether additional RMAs should be considered. Also, RMAs such as limiting activities that could trigger certain initiators (for example, limiting activities in the switchyard if an EDG RICT was entered), or briefing operator crews on the appropriate procedure, to increase the success likelihood of the operator action would be considered. Additionally, if the RICT entry is emergent and the extent of condition for the remaining equipment is not yet known, or the potential for common cause failure has not yet been fully determined, RMAs would be developed specifically to address the potential loss of function if an event would occur.

b. Please explain how that process will systematically evaluate the potential impact of uncertainties such as those discussed above into the identification and development of the configuration-specific RMAs.

Response

Areas of uncertainty noted in the RAI will be systematically addressed through the processes described in response to RAI 9a. For example, uncertainty related to transient combustibles and hot work may be addressed by imposing transient combustible/hot work controls as is done already in the online fire risk management program under the Maintenance Rule. Human failure event uncertainty is addressed as above by the review of procedures and shift briefings.

(10) While the guidance in NEI 06-09 states that no common cause failure (CCF) adjustment is required for planned maintenance, the NRC approval of NEI 06-09 is based on RG 1.177, Revision 1, "An Approach for Plaint-Specific, Risk-Informed Decisionmaking: Technical Specifications" (ADAMS Accession No. ML 100910008), as indicated in the NRC SE to NEI 06-09. Specifically, Section 2.2 of the NRC SE for NEI 06-09 states that "Specific methods and guidelines acceptable to the NRC staff are also outlined in RG 1.177 for assessing risk-informed TS changes." Further, Section 3.2 of the NRC SE states that compliance with the guidance of RG 1.17 4 and RG 1.177, which provides an acceptable method for implementing specific regulations, is achieved by evaluation using a comprehensive risk analysis, which assesses the configuration-specific risk by including contributions from human errors and CCFs.

The guidance in RG 1.177, Section 2.3.3.1, states that "CCF modeling of components is not only dependent on the number of remaining inservice components, but is also dependent on the reason components were removed from service (i.e. whether for preventative or corrective maintenance)." In relation to CCF for preventive maintenance, the guidance in RG 1.177, Appendix A, Section A-1.3.1.1, states:

> If the component is down because it is being brought down for maintenance, the CCF contributions involving the component should be modified to remove the component and to only include failures of the remaining components (also see Regulatory Position 2.3.1 of Regulatory Guide 1.177).

According to RG 1.177, if a component from a CCF group of three or more components is declared inoperable, the CCF of the remaining components should be modified to reflect the reduced number of available components in order to properly model the as-operated plant.

a. Explain how CCFs are included in the PRA model (e.g., with all combinations in the logic models as different basic events or with identification of multiple basic events in the cutsets).

Response

In the CCNPP PRA models, common cause failures are modeled as separate basic events in the fault tree model, with common cause combinations in the fault tree as different basic events.

b. Explain how the quantification and/or models will be changed when, for example, one component from a CCF group of three or more components is removed for preventative maintenance and describe how the treatment of CCF either meets the guidance in RG 1.177 or meets the intent of this guidance when quantifying a RICT.

Response

Common cause grouping is not dynamically changed during configuration risk analyses when a component is removed from service for preventive maintenance. This is appropriate in that the component, though not out of service for a reason subject to common cause failure, remains a participant in the common cause events for the remainder of the component operation.

(11) According to Section A-1.3.2.1 of Appendix A of RG 1.177, when a component fails, the CCF probability for the remaining redundant components should be increased to represent the conditional failure probability due to CCF of these components in order to account for the possibility that the first failure was caused by a CCF mechanism. When a component fails, the calculation of the plant risk, assuming that there is no increase in CCF potential in the redundant components before any extent of condition evaluation is completed, could lead to a non-conservative extended completion time calculation, as illustrated by inclusion of the guidance in Appendix A of RG 1.177. Much of the discussion in Appendix A describes how configuration-specific risk calculations should be performed.

In Section 3.2 of the NRC SE for NEI 06-09, the NRC staff stated that compliance with the guidance of RG 1.17 4 and RG 1.177, which provides an acceptable method for implementing specific regulations, is achieved by evaluation using a comprehensive risk analysis, which assesses the configuration-specific risk by including contributions from human errors and CCFs.

The limitations and conditions in Section 4.0 of the SE for NEI 06-09 state that the NRC staff interprets NEI 06-09 as requiring consideration of additional RMAs due to the potential for increased risks from CCF of similar equipment whenever the redundant components are considered to remain operable, but the licensee has not completed the extent of condition (or more correctly extent of cause) evaluations.

The requirement to consider additional RMAs prior to the completion of the extent of cause evaluation was included by the NRC staff in the SE for NEI 06-09 as an additional measure to account for the increased potential that the first failure was caused by a CCF mechanism. However, no exception to the RG 1.177 guidance was taken in the calculation of the RICT with regard to the quantification of the unresolved potential for CCF before the extent of cause evaluation is complete. The NRC staff interprets that the combined guidance in RG 1.177 and NEI 06-09 could be met with the following actions:

- When, prior to exceeding the front stop, there is a high degree of confidence based on the evidence collected there is no CCF mechanism that could affect the redundant components, the RICT calculation may use nominal CC factor probability.

- If a high degree of confidence cannot be established that there is no CCF that could affect the redundant components, the RICT shall account for the increased possibility of CCF. Accounting for the increased possibility of CCF shall be accomplished by one of the two methods below. If one of the two methods below is not used, the TS front stop shall not be exceeded.

- The RICT calculation shall be adjusted to numerically account for the increased possibility of CCF in accordance with RG 1.177, as specified in Section A-1.3.2.1 of Appendix A of the RG. Specifically, when a component fails, the CCF probability for the remaining redundant components shall be increased to represent the conditional failure probability due to CCF of these components in order to account for the possibility the first failure was caused by a common cause mechanism.

- Prior to exceeding the front stop, the licensee shall implement RMAs not already credited in the RICT calculation that target the success of the redundant and/or diverse SSCs of the failed SSC, and, if possible, reduce the frequency of initiating events that call upon the function(s) performed by the failed SSC. Documentation of RMAs shall be available for NRC review.

a. Confirm and describe how that treatment of CCF in the case of an emergent failure either meets the guidance in RG 1.177 or meets the intent of this guidance, together with the NEI 06-09 guidance when quantifying a RICT.

Response

As described in Enclosure 12 of Reference 1, if the extent of condition for an emergent failure is not known, RMAs targeting the impact of a potential common cause failure will be developed and implemented addressing impacted initiators and supporting the success of redundant or diverse SSCs. These RMAs would not be part of the quantification of the RICT. This meets the intent of the second alternative described in the RAI for addressing common cause failure.

b. Update the TS administrative section to include the guidance on treatment of CCFs in the RICT program.

Response

The following, based on TSTF-17-01, "Response to NRC Questions on TSTF-505-A, 'Provide Risk-informed Extended Completion Times'," (Reference 6) is proposed to be added to the Risk Informed Completion Time Program description in TS 5.5.18:

d. If the extent of condition evaluation for inoperable structures, systems, or components (SSCs) is not complete prior to exceeding the Completion Time,

the RICT shall account for the increased possibility of common cause failure (CCF) by either:

1. Numerically accounting for the increased possibility of CCF in the RICT calculation; or

2. Risk Management Actions (RMAs) not already credited in the RICT calculation shall be implemented that support redundant or diverse SSCs that perform the function(s) of the inoperable SSCs, and, if practicable, reduce the frequency of initiating events that challenge the function(s) performed by the inoperable SSCs.

See the attached TS markups in Attachment 2.

(12) In the proposed changes to TS Administrative Section 5.5.18, the constraint currently states:

When a RICT is being used, any plant configuration change within the scope of the Risk Informed Completion Time Program must be considered for the effect on the RICT.

The parallel limitations from the NRC SE for NEI 06-09 are:

When a RICT is being used, any plant configuration change within the scope of the CRMP must be considered for the effect on the RICT.

Revise the constraint to clearly identify which configuration changes will be considered for the effect on the RICT, as, for example:

When a RICT is being used, any change to the plant configuration, as defined in NEI 06-09, Appendix A, must be considered for the effect on the RICT.

Response

As indicated above, the constraint in TS 5.5.18 is revised to state the following:

When a RICT is being used, any change to the plant configuration, as defined in NEI 06-09-A, Appendix A, must be considered for the effect on the RICT.

(13) NEI 06-09, Revision 0-A, references Nuclear Management and Resources Council (NUMARC) 93-01, Revision 3, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," and RG 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants," as providing support for the risk-managed TSs guidelines. Specifically, the limits established for entry into a RICT and for RMA implementation are consistent with the guidance of NUMARC 93-01, endorsed by RG 1.182, as applicable to plant maintenance activities. The current NUMARC 93-01 version is Revision 4A. RG 1.182 has been withdrawn and its subject matter is included in Revision 3 of RG 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants."

State whether the latest version of NUMARC 93-01 and appropriate sections of RG 1.160 will be referenced and used in the RICT program.

Response

The latest version of NUMARC 93-01 and RG 1.160 are used at CCNPP and will be referenced and used in the RICT program.

(14) The LAR, as supplemented, includes a RICT for LCO Condition 3.6.6.A, "One containment spray train inoperable," and Condition 3.6.6.B, "One containment cooling train inoperable." As stated in LAR Table E1-1, the function of the containment spray system is to provide containment atmosphere cooling and limit post-accident pressure increase and iodine removal. The function of the containment cooling system is to provide containment atmosphere cooling. The SE for NEI 06-09 states that a RICT can be applied to SSCs that are either modeled in the PRA, or whose impact can be quantified using conservative or bounding approaches.

LAR Table E1-1 states that "SSCs are modeled consistent with the TS scope and so can be directly evaluated using the CRMP tool" and that "The success criteria in the PRA are consistent with the design basis criteria," but did not provide any description of the PRA modeling for these systems.

Describe how containment spray and containment cooling systems are modeled in the PRA and how a RICT based on CDF and LERF can be quantitatively determined for these systems.

Response

Both systems are explicitly modeled in the CCNPP PRA and can be numerally quantified for impact on CDF and LERF.

The top events for containment spray system are the two containment spray headers. The modeling includes system components, such as pumps, valves, and heat exchangers, and system dependencies, such as electrical and cooling water systems. The PRA success criteria for the containment spray system is one of two headers.

The top events for the containment air recirculation and cooling system are the four containment air coolers. The modeling includes system components, such as coolers, fans, and valves, and system dependencies, such as electrical and cooling water systems. The PRA success criteria for the containment air recirculation and cooling system is two of four air coolers.

(15) In Section 4.0, "Limitations and Conditions," of the NRC staff SE to NEI 06-09, the staff stated:

> As part of its review and approval of a licensee's application requesting to implement the RMTS, the NRC staff intends to impose a license condition that will explicitly address the scope of the PRA and non-PRA methods approved by the NRC staff for use in the plant-specific RMTS program. If a licensee wishes to change its methods, and the change is

outside the bounds of the license condition, the licensee will need NRC approval, via a license amendment, of the implementation of the new method in its RMTS program.

Propose a license condition limiting the scope of the PAA and non-PAA methods to what is approved by the NRC staff for use in the plant-specific RMTS program. For example:

> The risk assessment approach, methods, and data shall be acceptable to the NRC, be based on the as-built, as-operated, and maintained plant; and reflect the operating experience at the plant. Acceptable methods to assess the risk from extending the completion times must be PAA methods accepted as part of this license amendment, or other methods currently approved by the NRC for generic use. If a licensee wishes to change its methods and the change is outside the bounds of this license condition, the licensee will need prior NRC approval, via a license amendment.

<u>Response</u>

In lieu of a license condition, the following items are proposed to be added to the RICT Program in TS Section 5.5.18 to address this issue:

e. A RICT must be calculated using the PRA and non-PRA methods approved by the NRC, including internal events, internal floods, and fire PRA. Changes to these PRA and non-PRA methods require prior NRC approval. The PRA maintenance and upgrade process will validate that changes to the PRA models used in the RICT program follow the guidance in Appendix 1-A of ASME/ANS RA-Sa-2009, "Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications."

f. A report shall be submitted following each PRA upgrade and associated peer review, and prior to using the upgraded PRA to calculate a RICT. The report shall describe the scope of the upgrade.

See the attached TS Markups in Attachment 2.

(16) LCO 3.8.4, "DC Sources-Operating," requires that four channels of direct current (DC) electrical sources shall be operable. Condition A is applicable when one DC channel is inoperable due to an inoperable battery and the reserve battery is available.

The LAA proposes to add the option of either applying the existing front stop completion time or applying a RICT for Required Action A.1. Required Action A.1 requires replacement of an inoperable battery with reserve battery. In general, the RICT program applies to required actions that restore a component to operable status, place an instrument channel in the tripped position, or isolate a containment penetration path with an inoperable isolation valve.

Please provide a justification, including a discussion of the effects on defense in depth and safety margins, for applying a RICT to a non-restorative action (i.e., the action directs replacement of the battery with the reserve battery instead of returning the normal battery to operable status).

Response

LCO 3.8.4, DC Sources Operating, Condition A, addresses one DC channel inoperable due to an inoperable battery. Since the reserve battery is a fully qualified and tested replacement for the inoperable battery, the DC channel is restored to Operability once the reserve battery is connected to the affected DC channel. The Condition is exited once the reserve battery is connected. Therefore, Condition A does restore the Operability of the DC channel.

CCNPP has 5 station batteries that can perform equivalent functions. They are described in UFSAR Table 8-10, Ratings and Construction of Station Batteries. A Note to the table identifies that Battery 01 (the reserve battery) can be a replacement for any of the other four batteries and must be able to handle any of the load cycles shown. The Note goes on to say that Battery 01 is tested using a unique load cycle that incorporates the largest discharge of any of the station battery's time intervals. Therefore, it is tested in a manner to allow it to be a fully qualified replacement for any battery.

(17) In Attachment 2 of the LAA, the licensee proposed to use the RICT program for the following Calvert Cliffs current TS conditions:

TS LCO	Conditions in LAR, Attachment 2 (current TS)
3.8.1	A One required LCO 3.8.1.a offsite circuit inoperable
3.8.1	B. One LCO 3.8.1.b DG inoperable
3.8.1	G. Two required LCO 3.8.1.a offsite circuits inoperable OR One required LCO 3.8.1.a offsite circuit that provides power to the CREVS and CRETS inoperable and the required LCO 3.8.1.c offsite circuit inoperable
3.8.1	H. One required LCO 3.8.1.a offsite circuit inoperable AND One LCO 3.8.1.b DG inoperable
3.8.4	A. One DC channel inoperable due to an inoperable battery and the reserve battery available
3.8.4	B. One DC channel inoperable for reasons other than Condition A
3.8.7	A. One required inverter inoperable
3.8.9	A. One or more AC electrical power distribution subsystems inoperable
3.8.9	B. One or more AC vital bus subsystem(s) inoperable
3.8.9	C. One DC electrical power distribution subsystem inoperable

In Enclosure 1 of the LAR, Table E1-1, "In Scope TS/LCO Conditions to Corresponding PRA Functions," and Table E1-2, "In Scope TS/LCO Conditions RICT Estimate," provide the PRA functions and the RICT estimates, respectively, for the following TS conditions:

TS LCO	Conditions in LAR, Tables E1-1 and E1-2
3.8.1	A. One offsite power source inoperable
3.8.1	B. One DG inoperable
3.8.1	G. Two offsite power sources inoperable or Offsite source and EDG to CREV/CRETs power supply
3.8.1	H. One offsite power source AND One DG inoperable
3.8.4	A. One battery inoperable and the reserve battery available
3.8.4	B. One DC channel inoperable
3.8.7	A. One inverter inoperable
3.8.9	A. One AC distribution subsystem inoperable
3.8.9	B. One or more AC vital subsystems inoperable
3.8.9	C. One DC distribution subsystem inoperable

The staff notes that the above TS conditions in Attachment 2 (first RAI table) of the LAR are different from the TS conditions in Table E1-1 and E-2 (second RAI table) of the LAR.

Provide a discussion on this discrepancy, or revise LAR Tables E1-1 and E1-2 for the correct electrical power systems TS conditions, as provided in the Calvert Cliffs current TSs.

Response

See attached Enclosure 1, Table E1-1 and E1-2 excerpts with the modified description of the LCO Condition as specified in the current TS.

(18) NEI 06-09, Revision 0-A, states that RMAs and compensatory actions for significant components should be predefined to the extent practicable in plant procedures and implemented at the earliest appropriate time in order to maintain defense in depth.

Moreover, the NRC staff's SE for NEI 06-09, Section 4.0, states that a licensee's LAR adopting the NEI 06-09 initiative will describe the process to identify and provide compensatory measures and RMAs during extended completion times and provide examples of compensatory measures or RMAs.

In the LAR dated February 25, 2016, Enclosure 12, "Risk Management Action Examples," the licensee provided an example of RMAs that may be considered during the RICT program entry for an inoperable.

a. Provide similar examples of RMAs that assure a reasonable balance of defense in depth is maintained for the proposed electrical power systems TS 3.8.1, Conditions A, G, and H; TS 3.8.4, Conditions A and B; TS 3.8.7, Condition A; and TS 3.8.9, Conditions A, B, and C.

Response

Each of the TS conditions is listed below with example RMAs for that condition.

3.8.1.A - One required LCO 3.8.1.a offsite circuit inoperable

The required offsite circuits consist of the electrical path from the offsite circuit down to the onsite 4kV ESF bus, including the intermediate transformers, busses and voltage regulators. The RMAs taken will vary depending on the cause of the LCO entry. Entry into the LCO would be for any component(s) that would limit the unit's connection between its safety related 4kV busses and the offsite electrical grid (e.g., removal of 2 of 3 high lines, P-13000-1 13kV service transformer, or a feeder breaker to one of the 13kV service busses). RMAs include:

- Prohibit any elective maintenance on the following systems:
    - SMECO offsite source line
    - Remaining 500kV offsite circuits
    - All onsite EDGs
    - Any part of the AFW system
    - Any components in the switchyard
    - Any electrical component from the switchyard down to the safety related 4kV busses.
- Protect equipment as directed by OP-AA-108-117, "Protected Equipment Program."
    - This includes all the above listed systems
- Contact the TSO (Transmission System Operator) prior to entering the condition to verify grid stability and that protective barriers are in place at the Waugh Chapel switchyard.
    - TSO will be contacted periodically to verify status of grid
- Evaluate weather forecast prior to entering the condition to ensure favorable conditions exist for the entire length of the expected OOS window.
    - Shift Crew will evaluate the weather forecast for changes on a per shift basis.
- Prohibit trip sensitive activities and activities that could result in a plant transient.
- Brief Shift crews on EOP and AOP responses to loss of offsite power.
- Pre-stage material for work as appropriate.

3.8.1.G - Two required LCO 3.8.1.a offsite circuits inoperable OR One required LCO 3.8.1.a offsite circuit that provides power to the CREVS and CRETS inoperable and the required LCO 3.8.1.c offsite circuit inoperable

- Execute RMAs as stated for 3.8.1.A above.
- Protect fully powered CRETS/ CREVS train as directed by OP-AA-108-117.
- Hold additional Shift crew briefs on a loss of ventilation.

3.8.1.H - One required LCO 3.8.1.a offsite circuit inoperable AND One LCO 3.8.1.b DG inoperable

Execute the Diesel Generator RMAs from the original LAR, Enclosure 12, and the RMAs from 3.8.1.A above. Protect equipment on division with operable EDG.

The Diesel Generator RMAs from Enclosure 12 of Reference 1 are:

- Contact the Transmission System Operator (TSO) to determine the reliability of offsite power supplies prior to entering a RICT, and implement RMAs during times of high grid stress conditions, such as during high demand conditions.
- Evaluate weather conditions for threats to the reliability of offsite power supplies.
- Defer elective maintenance in the switchyard, on the station electrical distribution systems, and on the main and auxiliary transformers associated with the unit.
- Defer planned maintenance or testing that affects the reliability of the operable DGs and their associated support equipment. Defer planned maintenance activities on station blackout mitigating systems.
- Protect equipment as directed by OP-AA-108-117.
- Defer planned maintenance or testing on redundant train safety systems. If testing or maintenance activities must be performed, a review of the potential risk impact will be performed.
- Implement 10 CFR 50.65(a)(4) fire-specific RMAs associated with the affected DG.
- Brief the on-shift operations crew concerning the unit activities, including any compensatory measures established, and review the appropriate emergency operating procedures for a Loss of Offsite Power.

3.8.4.A - One DC channel inoperable due to an inoperable battery and the reserve battery available

The action would be to align the reserve battery to the DC bus with the inoperable battery at which time the LCO would be exited since the reserve battery is fully qualified as a replacement for the normally aligned battery. If alignment is not possible then entry into TS 3.8.4.B would be required.

3.8.4.B - One DC channel inoperable for reasons other than condition A

If related to a battery take the RMAs from the original LAR:

- Commence immediate actions to restore the inoperable battery to an operable status.
- Protect equipment as directed by OP-AA-108-117.
    - This protection would include prohibiting all elective maintenance on any Vital AC or DC bus and its associated support equipment.
- Take any required Fire 10 CFR 50.65(a)(4) actions
- Brief Shift crews on required actions per associated Abnormal Operating Procedures (AOPs) and emergency Operating Procedures (EOPs) with emphasis on the required response to major loads lost.
- Pre-stage materials for work activity

3.8.7.A - One required inverter inoperable

- Align the associated vital AC bus to the Inverter Backup Bus to restore to service.
- Take any fire a4 actions

- Protect equipment under the predetermined protection scheme database as directed by OP-AA-108-117.
- Brief Shift crews on required actions per associated AOPs and EOPs for loss of a vital AC bus.
- Pre-stage materials for work activity

3.8.9.A - One or more AC electrical power distribution subsystems inoperable

- Protect remaining AC power distribution subsystems, per OP-CA-108-117, "Calvert Cliffs Site Specific Protected Equipment Guidance."
- Prohibit any elective maintenance on ALL safety related AC distribution subsystems.
- Take the required actions per AOP for loss of AC distribution subsystem. This would include the direction to cross tie busses as appropriate for risk significant equipment.
- Pre-stage material for work activity and ensure parts availability for any contingent work

3.8.9.B - One or more AC vital bus subsystem(s) inoperable

- Protect remaining AC and DC vital bus subsystems, per OP-CA-108-117.
- Minimize activities on equipment powered by remaining AC vital bus
- Prohibit any elective maintenance on ALL vital AC and DC distribution subsystems.
- Take the required actions per AOP for loss of Vital AC distribution subsystem. This would include the direction to cross tie busses as appropriate for risk significant equipment.
- Prohibit trip sensitive activities and activities that could result in a plant transient.
- Take any maintenance a4 fire risk RMAs
- Pre-stage materials for work activity

3.8.9.C - One DC electrical power distribution subsystem inoperable

- Protect remaining AC and DC power distribution subsystems, per OP-CA-108-117.
- Prohibit any elective maintenance on ALL vital AC and DC distribution subsystems.
- Take the required actions per AOP for loss of Vital DC distribution subsystem. This would include the direction to cross tie busses as appropriate for risk significant equipment.
- Prohibit trip sensitive activities and activities that could result in a plant transient.
- Take any maintenance a4 fire risk RMAs
- Pre-stage materials for work activity

b. Provide similar examples of RMAs that include the use of additional equipment for the proposed electrical power systems TS 3.8.1, Conditions A, G, and H; TS 3.8.4, Conditions A and B; TS 3.8.7, Condition A; and TS 3.8.9, Conditions A, B, and C.

Response

At the current time CCNPP does not plan to use additional equipment for RICT RMAs. If the station chooses to do so in the future any additional equipment would be reviewed to ensure that it would effectively support the associated function for the plant and would be controlled under the plant temporary change process that is used for routine maintenance and outage activities.

References

1. Letter from David Helker (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 1, "Provide Risk-Informed Extended Completion Times - RITSTF Initiative 4b," dated February 25, 2016 (ADAMS Accession No. ML16060A223).

2. Letter from James Barstow (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Supplement - License Amendment Request to Revise Technical Specifications to Adopt Risk Informed Completion Times TSTF-505, Revision 1, "Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b," dated April 3, 2017 (ADAMS Accession No. ML17094A591).

3. Letter from Michael Marshall, U.S. Nuclear Regulatory Commission, to Bryan Hanson, Exelon Generation Company, LLC, "RESPONSE REQUESTED: [Final] RAIs on CCNPP Risk-Informed Completion Time LAR (MF7415 AND MF7416; L-2016-LLA-0001)," dated November 13, 2017 (ADAMS Accession No. ML17304A941).

4. NUREG/CR-4461, “Tornado Climatology of the Contiguous United States,” Revision 2, February 2007.

5. NEI 17-02, "Tornado Missile Risk Evaluator (TMRE) Guidance Document," Revision 1, September 2017.

6. Technical Specifications Task Force (TSTF) Letter TSTF-17-01, "Response to NRC Questions on TSTF-505-A, 'Provide Risk-informed Extended Completion Times',” dated September 27, 2017.

ATTACHMENT 2

License Amendment Request Supplement

Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Docket Nos. 50-317 and 50-318

Response to Request for Additional Information
Revise Technical Specifications to Adopt Risk Informed
Completion Times TSTF-505, Revision 1, "Provide Risk-Informed
Extended Completion Times - RITSTF Initiative 4b."

<u>Proposed Technical Specification Changes (Markups)</u>

1.3 Completion Times

The Completion Time clock for Condition A does not stop after Condition B is entered, but continues from the time Condition A was initially entered. If Required Action A.1 is met after Condition B is entered, Condition B is exited and operation may continue in accordance with Condition A, provided the Completion Time for Required Action A.2 has not expired.

Insert 1

IMMEDIATE COMPLETION TIME

When "Immediately" is used as a Completion Time, the Required Action should be pursued without delay and in a controlled manner.

Insert 1

EXAMPLE 1.3-8

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One subsystem inoperable.	A.1 Restore subsystem to OPERABLE status.	7 days OR In accordance with the Risk Informed Completion Time Program
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

When a subsystem is declared inoperable, Condition A is entered. The 7 day Completion Time may be applied as discussed in Example 1.3-2. However, the licensee may elect to apply the Risk Informed Completion Time Program which permits calculation of a Risk Informed Completion Time (RICT) that may be used to complete the Required Action beyond the 7 day Completion Time. The RICT cannot exceed 30 days. After the 7 day Completion Time has expired, the subsystem must be restored to OPERABLE status within the RICT or Condition B must also be entered.

The Risk Informed Completion Time Program requires recalculation of the RICT to reflect changing plant conditions. For planned changes, the revised RICT must be determined prior to implementation of the change in configuration. For emergent conditions, the revised RICT must be determined within the time limits of the Required Action Completion Time (i.e., not the RICT) or 12 hours after the plant configuration change, whichever is less.

If the 7 day Completion Time clock of Condition A has expired and subsequent changes in plant condition result in exiting the applicability of the Risk Informed Completion Time Program without restoring the inoperable subsystem to OPERABLE status, Condition B is also entered and the Completion Time clocks for Required Actions B.1 and B.2 start.

If the RICT expires or is recalculated to be less than the elapsed time since the Condition was entered and the inoperable subsystem has not been restored to OPERABLE status, Condition B is also entered and the Completion Time clocks

for Required Actions B.1 and B.2 start. If the inoperable subsystems are restored to OPERABLE status after Condition B is entered, Conditions A and B are exited, and therefore, the Required Actions of Condition B may be terminated.

3.3 INSTRUMENTATION

3.3.1 Reactor Protective System (RPS) Instrumentation-Operating

LCO 3.3.1 Four RPS bistable trip units, associated measurement channels, and applicable automatic bypass removal features for each Function in Table 3.3.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.1-1.

ACTIONS

------------------------------------NOTE------------------------------------
Separate Condition entry is allowed for each RPS Function.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more Functions with one RPS bistable trip unit or associated measurement channel inoperable except for Condition C (excore channel not calibrated with incore detectors).	A.1	Place affected bistable trip unit in bypass or trip.	1 hour
	AND		
	A.2.1	Restore affected bistable trip unit and associated measurement channel to OPERABLE status.	48 hours
		OR	
	A.2.2	Place affected bistable trip unit in trip.	48 hours

OR
In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One or more Functions with two RPS bistable trip units or associated measurement channels inoperable except for Condition C (excore channel not calibrated with incore detectors).	B.1	Place one affected bistable trip unit in bypass and place the other affected bistable trip unit in trip.	1 hour
	<u>AND</u>		
	B.2	Restore one affected bistable trip unit and associated measurement channel to OPERABLE status.	48 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program
C. One or more Functions with one or more power range excore channels not calibrated with the incore detectors.	C.1	Perform SR 3.3.1.3.	24 hours
	<u>OR</u>		
	C.2	Restrict THERMAL POWER to < 90% RTP.	24 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. One or more Functions with one automatic bypass removal feature inoperable.	D.1	Disable bypass channel.	1 hour
	<u>OR</u>		
	D.2.1	Place affected bistable trip units in bypass or trip.	1 hour
		<u>AND</u>	
	D.2.2.1	Restore automatic bypass removal feature and affected bistable trip unit to OPERABLE status.	48 hours
		<u>OR</u>	
	D.2.2.2	Place affected bistable trip unit in trip.	48 hours

<u>OR</u>
In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One or more Functions with two automatic bypass removal feature channels inoperable.	E.1 Disable bypass channels.	1 hour
	OR	
	E.2.1 Place one affected bistable trip unit in bypass and place the other in trip for each affected trip Function.	1 hour
	AND	
	E.2.2 Restore one automatic bypass removal feature and the affected bistable trip unit to OPERABLE status for each affected trip Function.	48 hours OR In accordance with the Risk Informed Completion Time Program

3.3 INSTRUMENTATION

3.3.3 Reactor Protective System (RPS) Logic and Trip Initiation

LCO 3.3.3 Six channels of RPS Matrix Logic, four channels of RPS Trip Path Logic, four channels of reactor trip circuit breakers (RTCBs), and four channels of Manual Trip shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODES 3, 4, and 5, with any RTCBs closed and any control element assemblies capable of being withdrawn.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Matrix Logic channel inoperable.	A.1 Restore Matrix Logic channel to OPERABLE status.	48 hours OR In accordance with the Risk Informed Completion Time Program
B. One channel of Manual Trip, RTCBs, or Trip Path Logic inoperable in MODE 1 or 2.	B.1 Open the affected RTCBs.	1 hour
C. One channel of Manual Trip, RTCBs, or Trip Path Logic inoperable in MODE 3, 4, or 5.	C.1 Open all RTCBs.	48 hours

3.3 INSTRUMENTATION

3.3.4 Engineered Safety Features Actuation System (ESFAS) Instrumentation

LCO 3.3.4 Four ESFAS sensor modules, associated measurement channels, and applicable automatic block removal features for each Function in Table 3.3.4-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

------------------------------------NOTE------------------------------------
Separate Condition entry is allowed for each ESFAS Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one ESFAS sensor module or associated measurement channel inoperable.	A.1 Place affected sensor module in bypass or trip.	1 hour
	AND	
	A.2.1 Restore affected sensor module and associated measurement channel to OPERABLE status.	48 hours
	OR	
	A.2.2 Place affected sensor module in trip.	48 hours

OR
In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One or more Functions with two ESFAS sensor modules or associated measurement channels inoperable.	B.1	Place one sensor module in bypass and place the other sensor module in trip.	1 hour
	<u>AND</u>		
	B.2	Restore one sensor module and associated measurement channel to OPERABLE status.	48 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program
C. One or more Functions with the automatic block removal feature of one sensor block module inoperable.	C.1	Disable affected sensor block module.	1 hour
	<u>OR</u>		
	C.2	Place affected sensor block module in bypass.	1 hour

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more Functions with the automatic block removal feature of two sensor block modules inoperable.	D.1 Disable affected sensor block modules. OR D.2.1 Place one affected sensor block module in bypass and disable the other for each affected ESFAS Function. AND D.2.2 Restore one automatic block removal feature and the associated sensor block module to OPERABLE status for each affected ESFAS Function.	1 hour 1 hour 48 hours OR In accordance with the Risk Informed Completion Time Program
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3. AND E.2 Be in MODE 4.	6 hours 12 hours

3.3 INSTRUMENTATION

3.3.5 Engineered Safety Features Actuation System (ESFAS) Logic and Manual Actuation

LCO 3.3.5 Two ESFAS Manual Actuation or Start channels and two ESFAS Actuation Logic channels shall be OPERABLE for each ESFAS Function specified in Table 3.3.5-1.

APPLICABILITY: According to Table 3.3.5-1.

ACTIONS

-------------------------------------NOTE-------------------------------------
Separate Condition entry is allowed for each ESFAS Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Auxiliary Feedwater Actuation System Manual Start channel or Actuation Logic channel inoperable.	A.1 Restore affected Auxiliary Feedwater Actuation System Manual Start channel and Actuation Logic channel to OPERABLE status.	48 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. <u>AND</u> B.2 Be in MODE 4.	6 hours 12 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or more Functions with one Manual Actuation channel or Actuation Logic channel inoperable except Auxiliary Feedwater Actuation System.	C.1 Restore affected Manual Actuation channel and Actuation Logic channel to OPERABLE status.	48 hours OR In accordance with the Risk Informed Completion Time Program
D. Required Action and associated Completion Time of Condition C not met for one Manual Actuation channel.	D.1 Be in MODE 3. AND D.2 Be in MODE 5.	6 hours 36 hours
E. Required Action and associated Completion Time of Condition C not met for one Actuation Logic channel.	E.1 Be in MODE 3. AND E.2 Be in Mode 4.	6 hours 12 hours

3.3 INSTRUMENTATION

3.3.6 Diesel Generator (DG)-Loss of Voltage Start (LOVS)

LCO 3.3.6 Four sensor modules and measurement channels per DG for the Loss of Voltage Function, four sensor modules and measurement channels per DG for the Transient Degraded Voltage Function, and four sensor modules and measurement channels per DG for the Steady State Degraded Voltage Function shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

------------------------------------NOTE------------------------------------
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one sensor module or associated measurement channel per DG inoperable.	A.1 Place sensor module in bypass or trip.	1 hour
	AND	
	A.2.1 Restore sensor module and associated measurement channel to OPERABLE status.	48 hours
	OR	
	A.2.2 Place the sensor module in trip.	48 hours

OR
In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One or more Functions with two sensor modules or associated measurement channels per DG inoperable.	B.1	Enter applicable Conditions and Required Actions for the associated DG made inoperable by DG-LOVS instrumentation.	1 hour
	<u>OR</u>		
	B.2.1	Place one sensor module in bypass and the other sensor module in trip.	1 hour
	<u>AND</u>		
	B.2.2	Restore one sensor module and associated measurement channel to OPERABLE status.	48 hours
C. One or more Functions with more than two sensor modules or associated measurement channels inoperable.	C.1	Restore at least two sensor modules and associated measurement channels to OPERABLE status.	1 hour

<u>OR</u>
In accordance with the Risk Informed Completion Time Program

3.5 EMERGENCY CORE COOLING SYSTEM (ECCS)

3.5.2 ECCS - Operating

LCO 3.5.2 Two ECCS trains shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with pressurizer pressure ≥ 1750 psia.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more trains inoperable. AND At least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.	A.1 Restore train(s) to OPERABLE status.	72 hours OR In accordance with the Risk Informed Completion Time Program
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Reduce pressurizer pressure to < 1750 psia.	6 hours 12 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued)	B.2	Lock an OPERABLE door closed in the affected air lock.	24 hours
	<u>AND</u>		
	B.3	--------NOTE ------- Air lock doors in high radiation areas may be verified locked closed by administrative means. --------------------	
		Verify an OPERABLE door is locked closed in the affected air lock.	Once per 31 days
C. One or more containment air locks inoperable for reasons other than Condition A or B.	C.1	Initiate action to evaluate overall containment leakage rate per LCO 3.6.1.	Immediately
	<u>AND</u>		
	C.2	Verify a door is closed in the affected air lock.	1 hour
	<u>AND</u>		
	C.3	Restore air lock to OPERABLE status.	24 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. -------- NOTE -------- Only applicable to penetration flow paths with two containment isolation valves and not a closed system. --------------------- One or more penetration flow paths with one containment isolation valve inoperable.	A.1	Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.	4 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program
	<u>AND</u>		
	A.2	--------NOTE ------- Isolation devices in high radiation areas may be verified by use of administrative means. -------------------- Verify the affected penetration flow path is isolated.	Once per 31 days following isolation for isolation devices outside containment <u>AND</u> Prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment

3.6 CONTAINMENT SYSTEMS

3.6.6 Containment Spray and Cooling Systems

LCO 3.6.6 Two containment spray trains and two containment cooling trains shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.
MODE 3, except containment spray is not required to be OPERABLE when pressurizer pressure is < 1750 psia.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One containment spray train inoperable.	A.1 Restore containment spray train to OPERABLE status.	72 hours
B. One containment cooling train inoperable.	B.1 Restore containment cooling train to OPERABLE status.	7 days
C. --------NOTE-------- Not applicable when second containment spray train intentionally made inoperable. -------------------- Two containment spray trains inoperable.	C.1 Verify LCO 3.7.8, "CREVS," is met. AND C.2 Restore at least one containment spray train to OPERABLE status.	1 hour 24 hours

OR
In accordance with the Risk Informed Completion Time Program

3.7 PLANT SYSTEMS

3.7.3 Auxiliary Feedwater (AFW) System

LCO 3.7.3 Two AFW trains shall be OPERABLE.

---------------------------- NOTE ----------------------------
AFW trains required for OPERABILITY may be taken out of service under administrative control for the performance of periodic testing.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

------------------------------------NOTE------------------------------------
LCO 3.0.4.b is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One steam-driven AFW pump inoperable.	A.1 Align remaining OPERABLE steam-driven pump to automatic initiating status.	72 hours
	AND	
	A.2 Restore steam-driven pump to OPERABLE status.	7 days OR In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One motor-driven AFW pump inoperable.	B.1	Align standby steam-driven pump to automatic initiating status.	72 hours
	<u>AND</u>		
	B.2	Restore motor-driven pump to OPERABLE status.	7 days
C. Two AFW pumps inoperable.	C.1	Align remaining OPERABLE pump to automatic initiating status.	1 hour
	<u>AND</u>		
	C.2	Verify the other unit's motor-driven AFW pump is OPERABLE.	1 hour
	<u>AND</u>		
	C.3	Verify, by administrative means, the cross-tie valve to the opposite unit is OPERABLE.	1 hour
	<u>AND</u>		
	C.4	Restore one AFW pump to OPERABLE status.	72 hours

<u>OR</u>
In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One AFW train inoperable for reasons other than Condition A, B, or C.	D.1 Restore AFW train to OPERABLE status.	72 hours OR In accordance with the Risk Informed Completion Time Program
E. Required Action and associated Completion Time of Condition A, B, C, or D not met.	E.1 Be in MODE 3. AND E.2 Be in MODE 4.	6 hours 12 hours
F. Two AFW trains inoperable.	F.1 ---------NOTE------- LCO 3.0.3 and all other LCO Required Actions requiring MODE changes are suspended until one AFW train is restored to OPERABLE status. -------------------- Initiate action to restore one AFW train to OPERABLE status.	 Immediately

3.7 PLANT SYSTEMS

3.7.5 Component Cooling (CC) System

LCO 3.7.5 Two CC loops shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One CC loop inoperable.	A.1	--------NOTE------- Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops--MODE 4," for shutdown cooling made inoperable by CC. -------------------- Restore CC loop to OPERABLE status.	72 hours OR In accordance with the Risk Informed Completion Time Program
B. Required Action and associated Completion Time of Condition A not met.	B.1 AND B.2	Be in MODE 3. Be in MODE 5.	6 hours 36 hours

3.7 PLANT SYSTEMS

3.7.6 Service Water (SRW) System

LCO 3.7.6 Two SRW subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SRW heat exchanger inoperable.	A.1 Isolate flow to one of the associated containment cooling units. ---------NOTE -------- Enter applicable Conditions and Required Actions of LCO 3.6.6, "Containment Spray and Cooling Systems," for one containment cooling train made inoperable by the heat exchanger. ----------------------	1 hour
	<u>AND</u>	
	A.2 Restore heat exchanger to operable status.	7 days <u>OR</u> In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One SRW subsystem inoperable.	B.1 --------NOTE------- Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources--Operating," for diesel generator made inoperable by SRW. -------------------- Restore SRW subsystem to OPERABLE status.	72 hours OR In accordance with the Risk Informed Completion Time Program
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3.	6 hours
	AND	
	C.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.6.1	-------------------NOTE------------------- Isolation of SRW flow to individual components does not render SRW inoperable. --- Verify each SRW manual, power-operated, and automatic valve in the flow path servicing safety-related equipment, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program

3.7 PLANT SYSTEMS

3.7.7 Saltwater (SW) System

LCO 3.7.7 Two SW subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SW subsystem inoperable.	A.1 ------- NOTES ------- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources-Operating," for emergency diesel generator made inoperable by SW System. 2. Enter application Conditions and Required Actions of LCO 3.4.6, "RCS Loops-MODE 4," for shutdown cooling made inoperable by SW System. -------------------- Restore SW subsystem to OPERABLE status.	72 hours OR In accordance with the Risk Informed Completion Time Program

3.7 PLANT SYSTEMS

3.7.18 Atmospheric Dump Valves (ADVs)

LCO 3.7.18 Two ADV lines shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is being relied upon for heat removal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required ADV line inoperable.	A.1 Restore ADV line to OPERABLE status.	48 hours OR In accordance with the Risk Informed Completion Time Program
B. Two ADV lines inoperable.	B.1 Restore one ADV line to OPERABLE status.	1 hour
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 4 without reliance upon steam generator for heat removal.	6 hours 24 hours

ACTIONS

-----NOTE-----

LCO 3.0.4.b is not applicable to DGs.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required LCO 3.8.1.a offsite circuit inoperable.	A.1 Perform SR 3.8.1.1 or SR 3.8.1.2 for required OPERABLE offsite circuits.	1 hour AND Once per 8 hours thereafter
	AND	
	A.2 Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable.	24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s)
	AND	
	A.3 Restore required offsite circuit to OPERABLE status.	72 hours OR In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.4.2 Perform SR 3.8.1.3 for OPERABLE DG(s). AND B.5 Restore DG to OPERABLE status.	24 hours 14 days
C. Required Action and associated Completion Time of Required Action B.1 not met.	C.1.1 Restore both DGs on the other unit to OPERABLE status and OC DG to available status. OR C.1.2 Restore DG to OPERABLE status.	72 hours

OR
In accordance with the Risk Informed Completion Time Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. Two required LCO 3.8.1.a offsite circuits inoperable. <u>OR</u> One required LCO 3.8.1.a offsite circuit that provides power to the CREVS and CRETS inoperable and the required LCO 3.8.1.c offsite circuit inoperable.	G.1 Declare required feature(s) inoperable when its redundant required feature(s) is inoperable.	12 hours from discovery of Condition G concurrent with inoperability of redundant required feature(s)
	<u>AND</u>	
	G.2 Restore one required offsite circuit to OPERABLE status.	24 hours
H. One required LCO 3.8.1.a offsite circuit inoperable. <u>AND</u> One LCO 3.8.1.b DG inoperable.	----------- NOTE ------------ Enter applicable Conditions and Required Actions of LCO 3.8.9, when Condition H is entered with no AC power source to any train. ----------------------------	
	H.1 Restore required offsite circuit to OPERABLE status.	12 hours
	<u>OR</u>	
	H.2 Restore DG to OPERABLE status.	12 hours

<u>OR</u>

In accordance with the Risk Informed Completion Time Program

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources-Operating

LCO 3.8.4 Four channels of DC electrical sources shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One DC channel inoperable due to an inoperable battery and the reserve battery available.	A.1 Replace inoperable battery with reserve battery.	4 hours
B. One DC channel inoperable for reasons other than Condition A.	B.1 Restore DC channel to OPERABLE status.	2 hours
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours

OR
In accordance with the Risk Informed Completion Time Program

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Inverters-Operating

LCO 3.8.7 Four inverters shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required inverter inoperable.	A.1 --------NOTE------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems-Operating" with any vital bus de-energized. -------------------- Restore inverter to OPERABLE status.	24 hours OR In accordance with the Risk Informed Completion Time Program
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems-Operating

LCO 3.8.9 The AC, DC, and AC vital bus electrical power distribution subsystems shall be OPERABLE.

OR

In accordance with the Risk Informed Completion Time Program

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more AC electrical power distribution subsystems inoperable.	A.1 Restore AC electrical power distribution subsystems to OPERABLE status.	8 hours
B. One or more AC vital bus subsystem(s) inoperable.	B.1 Restore AC vital bus subsystems to OPERABLE status.	2 hours
C. One DC electrical power distribution subsystem inoperable.	C.1 Restore DC electrical power distribution subsystem to OPERABLE status.	2 hours
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3. AND D.2 Be in MODE 5.	6 hours 36 hours

5.5 Programs and Manuals

inleakage, and assessing the CRE boundary as required by paragraphs c and d respectively.

5.5.18 ~~Not Used~~ Insert 2

5.5.19 Surveillance Frequency Control Program

This program provides controls for Surveillance Frequencies. The program shall ensure that Surveillance Requirements specified in the Technical Specifications are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met.

a. The Surveillance Frequency Control Program shall contain a list of Frequencies of those Surveillance Requirements for which the Frequency is controlled by the program.

b. Changes to the Frequencies listed in the Surveillance Frequency Control Program shall be made in accordance with NEI 04-10, "Risk-Informed Technical Specifications Initiative 5b, Risk Informed Method for Control of Surveillance Frequencies," Revision 1.

c. The provisions of Surveillance Requirements 3.0.2 and 3.0.3 are applicable to the Frequencies established in the Surveillance Frequency Control Program.

Insert 2

5.5.18 Risk Informed Completion Time Program

This program provides controls to calculate a Risk Informed Completion Time (RICT) and must be implemented in accordance with NEI 06-09, Revision 0, "Risk-Managed Technical Specifications (RMTS) Guidelines." The program shall include the following:

a. The RICT may not exceed 30 days;

b. A RICT may only be utilized in MODE 1, and 2;

c. When a RICT is being used, any change to the plant configuration, as defined in NEI 06-09-A, Appendix A, must be considered for the effect on the RICT.

    1. For planned changes, the revised RICT must be determined prior to implementation of the change in configuration.

    2. For emergent conditions, the revised RICT must be determined within the time limits of the Required Action Completion Time (i.e., not the RICT) or 12 hours after the plant configuration change, whichever is less.

    3. Revising the RICT is not required if the plant configuration change would lower plant risk and would result in a longer RICT.

d. If the extent of condition evaluation for inoperable structures, systems, or components (SSCs) is not complete prior to exceeding the Completion Time, the RICT shall account for the increased possibility of common cause failure (CCF) by either:

    1. Numerically accounting for the increased possibility of CCF in the RICT calculation; or

    2. Risk Management Actions (RMAs) not already credited in the RICT calculation shall be implemented that support redundant or diverse SSCs that perform the function(s) of the inoperable SSCs, and, if practicable, reduce the frequency of initiating events that challenge the function(s) performed by the inoperable SSCs.

e. A RICT must be calculated using the PRA and non-PRA methods approved by the NRC, including internal events, internal floods, and fire PRA. Changes to these PRA and non-PRA methods require prior NRC approval. The PRA maintenance and upgrade process will validate that changes to the PRA models used in the RICT program follow the guidance in Appendix 1-A of ASME/ANS RA-Sa-2009, "Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications."

f. A report shall be submitted following each PRA upgrade and associated peer review, and prior to using the upgraded PRA to calculate a RICT. The report shall describe the scope of the upgrade.

ENCLOSURE 1

License Amendment Request Supplement

Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Docket Nos. 50-317 and 50-318

Response to Request for Additional Information
Revise Technical Specifications to Adopt Risk Informed Completion Times TSTF-505, Revision 1, "Provide Risk-Informed Extended Completion Times - RITSTF Initiative 4b."

List of Revised Required Actions to Corresponding PRA Functions

List of Revised Required Actions to Corresponding PRA Functions

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

Proposed TS LCO Condition	**SSCs Covered by TS LCO Condition**	**SSCs Modeled in PRA**	**Function Covered by TS LCO Condition**	**Design Success Criteria**	**PRA Success Criteria**	**Comments**
3.8.1.A One required LCO 3.8.1.a offsite circuit inoperable	Two qualified circuits between the offsite transmission network and the onsite 1E AC Electrical Power Distribution System.	Yes	Provide power from offsite transmission network to onsite Class one buses.	One qualified circuit between the offsite transmission network and the onsite 1E AC Electrical Power Distribution System.	One qualified circuit between the offsite transmission network and the onsite 1E AC Electrical Power Distribution System.	SSCs are modeled consistent with the TS scope and so can be directly evaluated using the CRMP tool. The success criteria in the PRA are consistent with the design basis criteria.
3.8.1.B One LCO 3.8.1.b DG inoperable	Four EDGs. Two per unit.	Yes	Provide power to safety related buses when offsite power to them is lost.	One of two diesel generator (DGs) capable of supplying one train of the onsite Class 1E AC Electrical Power Distribution System	One of two diesel generator (DGs) capable of supplying one train of the onsite Class 1E AC Electrical Power Distribution System.	SSCs are modeled consistent with the TS scope and so can be directly evaluated using the CRMP. The success criteria in the PRA are consistent with the design basis criteria.

List of Revised Required Actions to Corresponding PRA Functions

Table E1-1: In Scope TS/LCO Conditions to Corresponding PRA Functions						
Proposed TS LCO Condition	**SSCs Covered by TS LCO Condition**	**SSCs Modeled in PRA**	**Function Covered by TS LCO Condition**	**Design Success Criteria**	**PRA Success Criteria**	**Comments**
3.8.1.G Two required LCO 3.8.1.a offsite circuits inoperable OR One required LCO 3.8.1.a offsite circuit that provides power to the CREVS and CRETS inoperable and the required LCO 3.8.1.c offsite circuit inoperable	See LCO Condition 3.8.1.A					
3.8.1.H One required LCO 3.8.1.a offsite circuit inoperable AND One LCO 3.8.1.b DG inoperable	See LCO Condition 3.8.1.A & 3.8.1.B					

List of Revised Required Actions to Corresponding PRA Functions

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

Proposed TS LCO Condition	SSCs Covered by TS LCO Condition	SSCs Modeled in PRA	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Comments
3.8.4.A One DC channel inoperable due to an inoperable battery and the reserve battery available	DC batteries	Yes	Ensure availability of required DC power to shut down the reactor and maintain it in a safe condition	Primary or reserve battery for each channel. Three of four channels.	Primary or reserve battery for each channel. Three of four channels.	SSCs are modeled consistent with the TS scope and so can be directly evaluated using the CRMP. The success criteria in the PRA are consistent with the design basis criteria.
3.8.4.B One DC channel inoperable for reasons other than Condition A	DC batteries, battery chargers, cabling and controls	Yes	Ensure availability of required DC power to shut down the reactor and maintain it in a safe condition	One of two chargers for each channel. Primary or reserve battery for each channel. Three of four channels.	One of two chargers for each channel. Primary or reserve battery for each channel. Three of four channels.	SSCs are modeled consistent with the TS scope and so can be directly evaluated using the CRMP. The success criteria in the PRA are consistent with the design basis criteria.

List of Revised Required Actions to Corresponding PRA Functions

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

Proposed TS LCO Condition	SSCs Covered by TS LCO Condition	SSCs Modeled in PRA	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Comments
3.8.7.A One required inverter inoperable	Four inverters per unit.	Yes	Provide AC power to vital buses	Three of four inverters	Three of four inverters	SSCs are modeled consistent with the TS scope and so can be directly evaluated using the CRMP. The success criteria in the PRA are consistent with the design basis criteria.
3.8.9.A One or more AC electrical power distribution subsystems inoperable	Two divisions	Yes	Provide power to safety related equipment.	One of two AC distribution systems	One of two AC distribution systems	SSCs are modeled consistent with the TS scope and so can be directly evaluated using the CRMP tool. The success criteria in the PRA are consistent with the design basis criteria.

List of Revised Required Actions to Corresponding PRA Functions

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

Proposed TS LCO Condition	SSCs Covered by TS LCO Condition	SSCs Modeled in PRA	Function Covered by TS LCO Condition	Design Success Criteria	PRA Success Criteria	Comments
3.8.9.B One or more AC vital bus subsystem(s) inoperable	Four vital AC buses	Yes	Provide AC power to RPS and ESFAS	Two of four vital AC buses.	Two of four vital AC buses	SSCs are modeled consistent with the TS scope and so can be directly evaluated using the CRMP. The success criteria in the PRA are consistent with the design basis criteria.
3.8.9.C One DC electrical power distribution subsystem inoperable	Four DC distribution trains	Yes	Ensure availability of required DC power to shut down the reactor and maintain it in a safe condition.	Three of four DC electrical power distribution subsystems	Three of four DC electrical power distribution subsystems	SSCs are modeled consistent with the TS scope and so can be directly evaluated using the CRMP tool. The success criteria in the PRA are consistent with the design basis criteria.

List of Revised Required Actions to Corresponding PRA Functions

Table E1-2: In Scope TS/LCO Conditions RICT Estimate	
Proposed TS/LCO Condition	**RICT Estimate[1,2]**
3.8.1.A One required LCO 3.8.1.a offsite circuit inoperable	30 days
3.8.1.B One LCO 3.8.1.b DG inoperable	30 days
3.8.1.G Two required LCO 3.8.1.a offsite circuits inoperable OR one required LCO 3.8.1.a offsite circuit that provides power to the CREVS and CRETS inoperable and the required LCO 3.8.1.c offsite circuit inoperable	16 days
3.8.1.H One required LCO 3.8.1.a offsite circuit inoperable AND one LCO 3.8.1.b DG inoperable	10 days
3.8.4.A One DC channel inoperable due to an inoperable battery and the reserve battery available	2 days
3.8.4.B One DC channel inoperable for reasons other than Condition A	15 hours[4]
3.8.7.A One required inverter inoperable	12 days[4]
3.8.9.A One or more AC electrical power distribution subsystems inoperable	4 days
3.8.9.B One or more AC vital bus subsystem(s) inoperable	12 days[4]
3.8.9.C One DC electrical power distribution subsystem inoperable	15 hours[4]

Note that the associated footnotes remain unchanged.

ENCLOSURE 2

License Amendment Request Supplement

Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Docket Nos. 50-317 and 50-318

Response to Request for Additional Information
Revise Technical Specifications to Adopt Risk Informed Completion Times TSTF-505, Revision 1, "Provide Risk-Informed Extended Completion Times - RITSTF Initiative 4b."

Supplemental Information for Response to Question 5a

A focused-scope peer review was conducted in January 2017 to review an upgrade made to portions of the PRA that address accidents initiated by internal floods. The supporting requirements (SRs) were assessed against Capability Category II.

One Finding F&O was identified as listed in the table below.

Finding from January 2017 Focused-Scope Peer Review						
F&O ID	**SR**	**Topic**	**Finding/Observation**	**Status**	**Disposition**	**Impact to TSTF-505 Implementation**
IFFS-01	IFEV-B1 IFEV-B2	Internal Flooding	The Internal Flood Notebook assembled in performing the upgrade to the internal flood PRA was judged not to satisfy the requirement that it document the internal flood-induced initiating events in a manner that facilitates PRA applications, upgrades, and peer review. Essential inputs to the calculation of flood frequencies associated with pipe ruptures is distributed among a variety files, some of which are not formally stored with other PRA information. Reconstructing the initiating frequencies was impossible without the assistance of members of the IFPRA team.	Open	The Internal Flood notebook was updated to improve documentation.	This is a documentation issue. The technical adequacy was not questioned. Not an issue for RICT calculations.