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U.S. Nuclear Regulatory Commission
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Limerick Generating Station, Units 1 and 2
Facility Operating License Nos. NPF-39 and NPF-85
NRC Docket Nos. 50-352 and 50-353

Subject: Response to Request for Additional Information
License Amendment Request
Proposed Technical Specification Allowed Outage Time Extensions to Support Residual Heat Removal Service Water Maintenance

References:

1. Letter from Pamela B. Cowan (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "License Amendment Request, Proposed Changes to Technical Specifications Sections 3.5.1, 3.6.2.3, 3.7.1.1, 3.7.1.2 and 3.8.1.1 to Extend the Allowed Outage Times," dated March 19, 2010.

2. Letter from Peter Bamford, U.S. Nuclear Regulatory Commission, to Michael J. Pacilio, Exelon Nuclear, "Limerick Generating Station, Units 1 and 2 - Request for Additional Information Regarding Proposed Technical Specification Allowed Outage Time Extensions to Support Residual Heat Removal Service Water (RHRSW) Maintenance (TAC Nos. ME3551 And ME3552)," dated September 21, 2010.

3. Letter from Peter Bamford, U.S. Nuclear Regulatory Commission, to Michael J. Pacilio, Exelon Nuclear, "Limerick Generating Station, Units 1 and 2 - Request for Additional Information Regarding Proposed Technical Specification Allowed Outage Time Extensions to Support Residual Heat Removal Service Water (RHRSW) Maintenance (TAC Nos. ME3551 And ME3552)," dated September 30, 2010.

In Reference 1, Exelon Generation Company, LLC (Exelon) requested changes to the Technical Specifications (TS), Appendix A of Operating License Nos. NPF-39 and NPF-85 for Limerick Generating Station (LGS), Units 1 and 2, respectively. The proposed changes would extend the TS allowed outage time (AOT) for the Unit 1 and Unit 2 Suppression Pool Cooling (SPC) mode of the Residual Heat Removal (RHR) system, the Residual Heat Removal Service Water (RHRSW) system, the Emergency Service Water (ESW) system, and the A.C. Sources - Operating (Emergency Diesel Generators) from 72 hours to seven (7) days in order to allow for repairs of the RHRSW system piping.

The NRC reviewed the license amendment request and identified the need for additional information in order to complete its evaluation of the amendment request. On August 3, 2010, draft questions were sent to Exelon to ensure that the questions were understandable, the regulatory basis for the questions was clear, and to determine if the information was previously docketed. The draft questions were discussed in a teleconference with the NRC on September 9, 2010. In Reference 2, the NRC formally issued the request for additional information. Attachment 1 to this letter provides a restatement of the questions along with Exelon's responses.

Upon further review of the license amendment request, the NRC again identified the need for additional information in order to complete its evaluation of the amendment request. On September 28, 2010, draft questions were sent to Exelon to ensure that the questions were understandable, the regulatory basis for the questions was clear, and to determine if the information was previously docketed. In Reference 3, the NRC formally issued the request for additional information. Attachment 2 to this letter provides a restatement of the questions along with Exelon's responses.

Attachment 3 to this letter provides revised proposed TS markups in response to the first request for additional information (Reference 2), which supersede in their entirety the proposed TS markups provided in the original submittal (Reference 1).

Exelon has concluded that the information provided in this response meets the intent of the original submittal (Reference 1) and does not impact the conclusions of the: 1) Technical Analysis, 2) No Significant Hazards Consideration under the standards set forth in 10 CFR 50.92(c), or 3) Environmental Consideration as provided in the original submittal (Reference 1).

This response to the requests for additional information contains revised regulatory commitments to implement the compensatory measures during the extended AOTs. The regulatory commitments were originally discussed in Section 4.2 of Attachment 1 of Reference 1, and are revised based on the attached responses. These commitments are listed in Attachment 4 and, where indicated, supersede the compensatory measures previously described in the original submittal (Reference 1).

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 29th day of October 2010.

Respectfully,

Pamela B. Cowan
Director, Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachment 1: Response to Request for Additional Information No. 1
Attachment 2: Response to Request for Additional Information No. 2
Attachment 3: Revised Proposed Technical Specifications Pages
Attachment 4: Summary of Regulatory Commitments

cc:	Regional Administrator - NRC Region I	w/ attachments
	NRC Senior Resident Inspector - Limerick Generating Station	"
	NRC Project Manager, NRR - Limerick Generating Station	"
	Director, Bureau of Radiation Protection - Pennsylvania Department of Environmental Protection	"

ATTACHMENT 1

License Amendment Request

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

Proposed Technical Specification Allowed Outage Time Extensions to Support Residual Heat Removal Service Water Maintenance

Response to Request for Additional Information No. 1

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION NO. 1
PROPOSED TECHNICAL SPECIFICATION ALLOWED OUTAGE TIME EXTENSIONS
TO SUPPORT RESIDUAL HEAT REMOVAL SERVICE WATER MAINTENANCE**

In Reference 1, Exelon Generation Company, LLC (Exelon) requested changes to the Technical Specifications (TS), Appendix A of Operating License Nos. NPF-39 and NPF-85 for Limerick Generating Station (LGS), Units 1 and 2, respectively. The proposed changes would extend the TS allowed outage time (AOT) for the Unit 1 and Unit 2 Suppression Pool Cooling (SPC) mode of the Residual Heat Removal (RHR) system, the Residual Heat Removal Service Water (RHRSW) system, the Emergency Service Water (ESW) system, and the A.C. Sources - Operating (Emergency Diesel Generators) from 72 hours to seven (7) days in order to allow for repairs of the RHRSW system piping.

The NRC reviewed the license amendment request and identified the need for additional information in order to complete its evaluation of the amendment request. On August 3, 2010, draft questions were sent to Exelon to ensure that the questions were understandable, the regulatory basis for the questions was clear, and to determine if the information was previously docketed. The draft questions were discussed in a teleconference with the NRC on September 9, 2010. In Reference 2, the NRC formally issued the request for additional information. The questions are restated below along with Exelon's responses.

1. The NRC staff has identified the following issues with the format and content of the proposed TS changes contained in Attachment 2 of the LAR:

   a. The footnotes extending the completion time (CT) are ambiguous in that each says the AOT "may be extended...for *up to a period* of 7 days..." *(added emphasis)*. This could be interpreted as a 7-day extension of the 72-hour CT, for a 10-day total. The wording "may be extended to 7 days" is more explicit and the licensee is requested to revise the proposed TS changes accordingly.

      Response

      The proposed TS markups have been revised to state "may be extended to 7 days" as requested (see the revised TS markups provided in Attachment 3). Note that the revised TS markups provided in Attachment 3 supersede in their entirety the proposed TS markups provided in the original submittal (Reference 1).

   b. The footnotes in each limiting condition for operation (LCO) action requirement identify that the extended CT may be applied once per calendar year "for one unit only," and also specify the status of the "opposite unit." Since the TSs are unit-specific, the references to the other unit are vague. Since the actual frequency of use for each unit is once per 2 years, this should be the stated frequency (i.e., "once every other calendar year"), and the "opposite unit" should refer to "Limerick Generating Station Unit X."

Response

The proposed TS markup to TS LCO 3.7.1.1, Action a.3 has been revised to state "once every other calendar year" as requested. Note that the proposed footnotes for the other TS LCOs have been revised to reference the new proposed TS LCO 3.7.1.1, Actions a.3.a) or a.3.b). Therefore, this change is no longer necessary for the other proposed TS LCO footnotes.

c. In the proposed TS changes, the reference to the compensatory measures refers to the NRC staffs safety evaluation authorizing this change. As this is a permanent change to the TSs, it would be more appropriate to identify the compensatory measures in the TSs, and not in an external reference. The licensee is requested to delineate in the TSs the compensatory measures being credited, consistent with the risk evaluation, and include any appropriate surveillances for those measures. Further, several compensatory measures refer to the availability of TS equipment covered by other LCOs (e.g., commitments 2b, 8a, and 8b). The TS change should specifically reference these LCOs being met without reliance upon any action requirement, rather than referring to non-TS commitments for availability of the same components already covered by TS LCOs.

Response

The proposed footnote to TS LCO 3.7.1.1, Action a.3 has been converted to sub-Actions a) and b) under Action a.3, which include the compensatory measures credited in the risk evaluation for the proposed configuration for the planned RHRSW piping repairs. In particular, the compensatory measures credited in the risk evaluation, as specified in Section 4.2 of the original submittal (Reference 1), are the first part of compensatory measure 2 and compensatory measures 8a and 8b (see the revised proposed TS markups provided in Attachment 3). Rather than creating new surveillances, these TS compensatory measures will be implemented through existing station procedures for protecting equipment and through a special procedure prepared to govern operations during the extended AOTs.

As described in the LAR, with one RHRSW return header disabled for piping replacement, the associated ESW loop will be aligned to the operable RHRSW return header such that both ESW loops and one RHRSW loop would rely on the operable RHRSW return header for a flow path to the spray pond. The possibility of a single active failure rendering the ESW System inoperable will be eliminated by de-energizing the ESW loop return isolation motor operated valves in their safe position. Although the ESW system will meet single active failure criteria in this alternate alignment, the ESW system no longer meets the intent of GDC 44 for suitable redundancy and separation to prevent impairment of safety function assuming a passive failure. For this reason, even though the ESW loop that is not aligned to its normal RHRSW return header and the associated components cooled by this ESW loop are covered by TS, they cannot be considered TS operable. Instead, they will be administratively declared inoperable and the TS action for a single ESW loop inoperable would be entered. The ESW loop that is administratively inoperable will, however, remain aligned for automatic initiation and will be capable of performing its intended design function.

d. The proposed change to add a fourth footnote to clarify the applicability of LCO 3.5.1, Emergency Core Cooling System, during hot shutdown conditions, is worded differently than the other footnotes, in that: 1) no reference is made to the status of the opposite unit being shutdown with the reactor vessel head removed and the reactor cavity flooded; and 2) the compensatory measures are not identified. Although this footnote is intended to clarify applicability (see request number 1.f for further discussion regarding this footnote) and does not extend a CT, these two omissions could have been included. The licensee should submit a revised specification for this footnote or explain why these two conditions should not specifically be applied to LCO 3.5.1. Alternatively, the licensee may provide a direct reference to LCO 3.7.1.1 for this and other supported system TS actions.

<u>**Response**</u>

The proposed footnote to TS LCO 3.5.1 is no longer considered necessary and is hereby withdrawn from this license amendment request (see the response to Item 1.f below).

e. The footnotes specifically address "repairs of one RHRSW subsystem piping." This would preclude the applicability of the extended CT for ESW system piping repairs, even though the amendment request identifies ESW as a system that is experiencing piping corrosion. The licensee is requested to confirm its understanding of the scope of system piping repairs permitted by this proposed change.

<u>**Response**</u>

The license amendment request only supports repairs to the RHRSW subsystem piping that is common to both units and is unisolable. ESW piping can be unitized and isolated from the non-outage unit for repairs. In this configuration, ESW piping repairs can be performed under existing TS requirements during outage conditions. Therefore, this LAR is limited to repairs to the RHRSW subsystem piping.

f. The marked up TS pages contained in Attachment 2 of the LAR, Insert A, states that "one of the two remaining LPCI [low-pressure coolant injection] subsystems may be inoperable in that it is aligned in the shutdown cooling mode... " Insert A does not direct any ACTIONS that may be derived from this note. Thus, as constructed, and under the conditions specified, the ACTIONS for the two remaining LPCI subsystems would have to be applied with the one subsystem lined up for shutdown cooling declared inoperable (3 subsystems total inoperable). If the intent of the note is to not require taking the ACTIONS required for the third subsystem inoperable, it must be re-worked. The approach taken in NUREG-1433, Standard Technical Specifications [Boiling Water Reactor] BWR/4, may be helpful in determining a proper construction.

<u>**Response**</u>

The footnote to TS LCO 3.5.1 was intended to support a possible unplanned shutdown of the operating unit, which would require the unit to be taken to the cold shutdown condition while performing the RHRSW subsystem piping repairs. Upon further evaluation, it has been determined that under this circumstance, existing TS requirements would be followed as required. Therefore, Exelon has determined that the proposed footnote to TS LCO 3.5.1 is not necessary and hereby withdraws the proposed change to TS LCO 3.5.1 from this license amendment request. As a result, the TS page showing the proposed change to TS LCO 3.5.1 is no longer included with the revised proposed TS markups (refer to Attachment 3 for the revised proposed TS markups).

2. In the LAR, Table 4-1 of Attachment 3 identifies plant changes not incorporated into the probabilistic risk assessment (PRA) model and provides a disposition of these items as to their impact on the application. Four changes are identified (LG2007-048, LG2007-049, LG2008-009, and LG2009-001) as deferred and not yet implemented, and the disposition is "no impact," based on the changes not yet being implemented. The licensee does not identify the risk impact on the TS change risk analyses once the plant changes are implemented. The licensee is requested to provide its disposition of the potential impact of each planned modification on the risk results supporting this proposed permanent TS change.

Response

The status of each of the items is provided below.

LG2007-048 and LG2007-049: The proposed changes associated with these two modifications have been subsequently cancelled. Therefore, there is no impact on the risk assessment.

LG2008-009: These Engineering Change Requests (ECRs) were identified as contingencies that have subsequently been voided or completed without the change being installed as the contingencies were determined not to be needed. Therefore, there is no impact on the risk assessment.

LG2009-001: The impact of the modification of the Standby Liquid Control System (SLCS) "C" pump from automatic to manual start can be bounded by assuming that the "C" SLCS pump fails to start. A sensitivity case run indicates that this has a very minimal impact (i.e., ~2E-9 on the calculated CDF values) and no impact (i.e., ~0.0 delta CDF) on the risk assessment results presented in Attachment 3 of the original LAR (Reference 1). Therefore, there is no impact on the risk assessment.

3. In the LAR, Table 4-2 of Attachment 3 identifies that supporting requirement SY-A12b from the PRA standard is not met, and identifies that a detailed investigation for flow diversion pathways has not been performed but would have a "very limited impact." The licensee is requested to provide its basis as to why this technical issue has a very limited impact. In addition, please address how flow diversion pathways were considered for the RHRSW and ESW systems for this application; if such pathways exist and are not modeled, then a sensitivity study or other disposition of the impact on the risk analyses needs to be provided.

Response

The intent of the statement in Table 4-2 of Attachment 3 was that the supporting requirement may not be met since a detailed analysis for flow diversion pathways for all modeled systems was not performed but rather were incorporated into the system models based on a generic assumption (i.e., flow diversions for low pressure systems are not modeled if the nominal pipe diameter of the flow diversion line is less than or equal to 1/3 of the nominal diameter of the required flow path line). However, several flow diversion pathways are included in the PRA model. For example, the RHRSW system logic modeling includes backflow through the alternate pump flow path in the same loop via a failed check valve, and the ESW system logic modeling includes backflow through the service water system via a failed boundary check valve.

In general, however, flow diversion pathways would represent a small impact on the overall system unreliability because they would require a failure to close of a boundary valve or valves, or a spurious operation of a normally closed valve. These failure modes would typically be low contributors to the overall system unreliability and would potentially be candidates for exclusion from the PRA model via supporting requirement SY-A15 from the combined ASME/ANS PRA Standard (Reference 3).

Since flow diversion pathways are included for ESW and RHRSW (and many other systems), and since these failure modes otherwise represent small contributions to system unreliability, the conclusion is that there is a very limited impact on the results for this application.

Additionally, as noted in response to RAI #4 below, the potential impact from inadvertent flow diversions in the form of pre-initiator misalignment errors is also minimized as compensatory measures are included to ensure proper alignment of the ESW and RHRSW systems prior to entering the AOT configuration.

4. In the LAR, Table 4-2 of Attachment 3 identifies that supporting requirement HR-A1 is not met since a formal review of plant maintenance and testing procedures and practices was not done to identify potential pre-initiator alignment errors. The impact is identified as "no impact" since the pre-initiator errors in the PRA model include those for specific systems identified as most relevant to this application. However, neither the RHRSW nor ESW systems are included in the scope of the pre-initiator events included in the PRA model. The licensee is requested to justify not including pre-initiator alignment errors for these systems in the PRA model, or disposition the impact of such errors.

Response

An RHRSW system pre-initiator is included in the model (and is referred to as an "RHR loop" pre-initiator in Table 4-2 of Attachment 3 in the LAR). The risk assessment results identified this pre-initiator (refer to discussions associated with basic event JHUMNA(B)DMI in Appendix B of Attachment 3 in the LAR) as an important contributor to the overall results. This pre-initiator represents the potential that the normally open RHRSW 12-1152A valve is not left in its normally open position, goes undetected, and renders the loop failed when the RHRSW pumps are started.

Based on this insight, compensatory measure #2 in the LAR was identified to ensure that the available RHRSW loop valves are in proper position prior to entering the AOT configuration. Additionally, compensatory measure #8 in the LAR will ensure that the ESW valves are also in proper alignment prior to entering the AOT configuration. The special procedure that will be created for entry into the AOT configuration will ensure that both the RHRSW and ESW systems are in proper alignment. These compensatory measures will virtually eliminate potential pre-initiator failure modes from occurring for these systems, thereby minimizing the potential risk from pre-initiators.

5. In the LAR, Table 4-2 of Attachment 3 identifies that supporting requirements DA-C6 and DA-C7 are not met for the use of actual plant data and practices in compiling component demand data, but identifies a minimal impact in that the values used in the PRA are a "reasonable representation of the best estimate reliability response of the plant." The data source is only identified as the "maintenance rule database," but there is no discussion of how this data is collected. The licensee needs to provide its basis for concluding that the data used to determine component demands and the number of surveillance tests and maintenance activities reasonably reflect the as-operated plant.

Response

The Maintenance Rule database contains the data collected to satisfy the requirements of 10 CFR 50.65(a)(2). The data is collected consistent with the scope of the maintenance rule functions and with the degree of rigor required to comply with the performance monitoring requirements of that program. The information in the database was used to provide a first order estimate of the demands and run-times for all of the plant-specific data utilized in the PRA model. These demand estimates reflect the actual plant practices and as such reasonably reflect the as-operated plant. The shortcoming with respect to the DA-C6 requirements is that the documentation for the demand estimate determination could be better, but this would not impact the PRA model results.

The DA-C7 requirement is to base the “number” of tests, maintenance activities, and unplanned maintenance on actual plant performance. Maintenance Rule data collection efforts are utilized to determine the total unavailability values used in the PRA model for risk significant systems. This data is collected for actual accrued unavailability hours due to any reason, but is not based on “number” of tests, maintenance activities, and unplanned maintenance as this is not necessary with the approach that is taken. Therefore, although not specifically tied to these parameters as may be required to meet the intent of the DA-C7 supporting requirement, this unavailability data reasonably reflects the as-operated plant.

6. In the LAR, Section A.3.1 of Attachment 3 discusses the technical aspects of the fire PRA model. The fire PRA is characterized as an update of the Individual Plant Examination of External Events and specifically identifies plant areas that are modeled (Main Control Room, Auxiliary Equipment Room, Turbine Building), unit-specific models, cable data for control

rod drive system, and completion of specific tasks from NUREG/CR-6850, "Fire PRA Methodology for Nuclear Power Facilities." The staff requests additional information to understand how the scope and technical adequacy of this model supports the requested TS change risk evaluation:

a. The Main Control Room, Auxiliary Equipment Room, and Turbine Building compartments are specifically identified as "refined analyses" and "integrated into the fire PRA results." It is not clear then how other plant areas are being treated in the fire PRA. If other areas are screened from consideration or conservatively modeled, do these areas include plant equipment (including required cables) that is relied upon during the RHRSW outage, such that the prior screening could be invalidated, or the conservative treatment could be masking the change in risk for the RHRSW outage configuration? The licensee is requested to better describe the scope of the fire PRA model for the plant areas modeled, and if appropriate, provide additional risk analysis for fire areas previously screened or conservatively modeled for this application.

   Response

   The fire PRA model utilized for the assessment includes a full scope representation from the risk of fire for over 100 fire compartments and the yard area. The selection of the global plant analysis boundary and the criteria for including/excluding plant areas are consistent with the current NUREG/CR-6850 guidance and methods. Additionally, no fire compartments (physical analysis units) were screened from final quantification in the fire PRA. Therefore, the scope of areas included is sufficient for this application.

b. Several areas of conservatism in the fire PRA model are identified. If a fire area is conservatively treated in the baseline model, then this may mask the change in risk for an application such as the RHRSW outage evaluation. For the delta-risk calculation, has an evaluation of the impact of the conservative treatments been made, and what are the conclusions of that evaluation? The licensee needs to demonstrate that model conservatism is not masking the fire risk impacts associated with the RHRSW outage evaluation. In addition, specifically address multiple spurious operations, instrumentation, iterations, and multi-compartment modeling assumptions for this specific application.

   Response

   For the delta risk evaluation, a specific analysis regarding the impact of potential conservatisms has not been performed. However, any potential masking from conservative treatments can be no larger than the calculated base fire CDF. Therefore, the maximum numerical impact on the delta risk assessment can be clearly bounded by assuming that conservative treatments would eliminate an amount equal to the base fire CDF in the delta risk evaluations. Revisions to portions of Table 3.3-1 from Attachment 3 of the LAR are shown to illustrate the potential bounding impact.

FIRE PRA INPUT PARAMETERS FOR BOUNDING CASE ASSESSMENT OF POTENTIAL IMPACT OF MASKING FROM CONSERVATISMS ON THE CALCULATED DELTA-RISK

(ORIGINAL VALUES FROM LAR SHOWN IN PARENTHESIS)

Input Parameter	Unit 1 Value	Unit 2 Value
$FCDF_{BASE}$	1.30E-05/yr (1.30E-5/yr)	1.43E-05/yr (1.43E-05/yr)
$FCDF_{A}$	5.29E-05/yr (3.99E-05/yr)	5.96E-05/yr (4.53E-05/yr)
$FCDF_{B}$	9.41E-05/yr (8.11E-05/yr)	8.82E-05/yr (7.39E-05/yr)

As can be seen, this bounding case leads to only about a 30% increase in the calculated fire CDFs for the A loop cases and to less than a 20% increase in the calculated fire CDFs for the B loop cases. When this bounding assumption is taken further to compare to the acceptance guidelines, there is a similar small impact as shown in the revisions to portions of Tables 3.4-1 and 3.4-2 from Attachment 3 of the LAR. That is, the net results indicate that the proposed configuration is still at or near that region of the acceptance guidelines such that compensatory measures are warranted. Appropriate compensatory measures have already been identified to minimize the overall risk associated with the configuration such the conclusions from the risk assessment would not be altered by the potential impact from making this bounding assumption.

COMPARISON OF RESULTS TO ACCEPTANCE GUIDELINES FOR BOUNDING CASE ASSESSMENT OF POTENTIAL IMPACT OF MASKING FROM CONSERVATISMS

(ORIGINAL VALUES FROM LAR SHOWN IN PARENTHESIS)

Figure of Merit	Value	Acceptance Guideline	Below Acceptance Guideline
Total Unit 1 Values			
ΔCDF	1.29E-06/yr (1.03E-06/yr)	<1.0E-06/yr for Region III, <1.0E-05/yr for Region II	Barely above Region III in Region II (Barely above Region III in Region II)
$ICCDP_{A}$	8.41E-07 (5.92E-07)	<1.0E-06, or <1.0E-5[(1)]	Yes (Yes)
$ICCDP_{B}$	1.64E-06 (1.39E-06)	<1.0E-06, or <1.0E-5[(1)]	Yes (Yes)
Total Unit 2 Values			
ΔCDF	1.27E-06/yr (9.88E-07/yr)	<1.0E-06/yr for Region III, <1.0E-05/yr for Region II	Barely above Region III in Region II (Just Below Region II in Region III)

COMPARISON OF RESULTS TO ACCEPTANCE GUIDELINES FOR BOUNDING CASE ASSESSMENT OF POTENTIAL IMPACT OF MASKING FROM CONSERVATISMS

(ORIGINAL VALUES FROM LAR SHOWN IN PARENTHESIS)

Figure of Merit	Value	Acceptance Guideline	Below Acceptance Guideline
$ICCDP_A$	9.46E-07 (6.72E-07)	<1.0E-06, or <1.0E-5[1]	Yes (Yes)
$ICCDP_B$	1.50E-06 (1.22E-06)	<1.0E-06, or <1.0E-5[1]	Yes (Yes)

(1) Per NUMARC 93-01 as endorsed by RG 1.182, a value between 1E-06, but less than 1E-05 may be deemed acceptable with effective compensatory measures implemented to reduce the sources of increased risk.

Consistent with the LAR evaluation, even with considering the potential bounding impact that masking conservatisms may have on the delta risk assessment, it is demonstrated with reasonable assurance that the proposed TS change is within the current risk acceptance guidelines (i.e., in Region III or barely in Region II) in RG 1.174 and not substantially above the acceptance guidelines in RG 1.177 for permanent changes. This combined with effective compensatory measures to maintain lower risk ensures that the TS change meets the intent of the ICCDP and ICLERP acceptance guidelines of 1.0E-05 and 1.0E-06 established for compatibility with the ICDP and ILERP limits of Section 11 in NUMARC 93-01, which is applicable for voluntary maintenance activities requiring risk management actions.

As for the additional items to address (multiple spurious operations, instrumentation, iterations, and multi-compartment modeling assumptions), these were noted in the submittal as items not yet incorporated into the current fire PRA model. There are some conservative elements identified and some non-conservative elements identified. In general, these items should not detract from the insights obtained from the use of the existing fire PRA model. As such, the compensatory measures that have been identified will help to minimize the overall risk associated with the configuration such that the conclusions from the risk assessment would not be altered by the potential impact that may arise from these other assessments. In addition, each of the elements is discussed more fully below.

Multiple spurious operations: Limerick is addressing multiple spurious operations in accordance with the NEI 00-01 (Reference 4). As part of this process, an expert panel was conducted in 2009 to disposition the generic BWR MSO scenarios and identify additional site specific MSOs. MSOs of concern have been entered into the corrective action program and will be evaluated to determine their impact on fire safe shutdown. Open issues will be handled with the development of hardware changes or the establishment of additional viable operator manual actions such that all of the fire safe shutdown requirements will be maintained. This approach combined with the low likelihood of MSOs ensures that the lack of current detailed modeling of MSOs will have a negligible impact on the fire PRA model, and especially on the delta risk assessment provided in the LAR.

Instrumentation: The instrumentation available to the operators at Limerick is highly redundant, diverse, and reliable. The fire safe shutdown program at Limerick ensures that there is at least one train of instrumentation free of fire damage for any fire area to support fire safe shutdown. Additionally, procedures (i.e., Fire Safe Shutdown Guides) exist that indicate what instruments can be trusted for fires in a given area. Therefore, the lack of detailed modeling of all required instrumentation will have a negligible impact on the fire PRA model, and especially on the delta risk assessment provided in the LAR.

Iterations: This was noted as a potential conservatism since the current Limerick fire PRA model has undergone limited iterations for scenario refinement. As such, the potential impact of this conservatism is bounded by the analysis described above.

Multi-compartment analysis: The design and plant layout of Limerick makes fire propagation to multiple compartments unlikely compared to the fire risk in individual compartments. Additionally, the identification of the important fire areas from the delta risk assessment in the LAR would not be altered by the incorporation of a detailed multi-compartment analysis into the fire PRA model. This, combined with the general high reliability of existing barriers (e.g., penetration seals and fire doors), ensures that the lack of current detailed multi-compartment analysis will have a negligible impact on the fire PRA model, and especially on the delta risk assessment provided in the LAR.

7. The calculated incremental conditional core damage probability (ICCDP) for internal fires for train A and train B differ for each unit by more than a factor of two, with train B being more significant in each unit. This effect is present in the internal events core damage frequency, but to a lesser degree. In addition, the unit-specific risk calculations are not identical for internal events for a train A outage, but are the same for train B, and the fire ICCDPs are different for each unit. Internal events large early release frequency values are also different between the two units. No explanation is provided for these asymmetries. The licensee is requested to explain the unit and train differences in the risk metrics in terms of actual plant differences or PRA modeling assumptions, and identify any insights obtained from these differences.

Response

The ICCDPs associated with the A train and B train are different based on the different fire CDF contributions delineated in Tables A-6 through A-9 of Attachment 3 of the LAR submittal. For both units, a fire in the Division 1 switchgear area (i.e., IEFR-013-B/C for Unit 1 in Table A-7 and IEFR-019-B/C for Unit 2 in Table A-9) results in failures of Division 1 and Division 3 equipment due to cable routing. Similar scenarios exist for fires in the Division 2 switchgear areas (i.e., IEFR-015-B/C for Unit 1 in Table A-6 and IEFR-017-B/C for Unit 2 in Table A-8) which result in failures of Division 2 and Division 4 equipment due to cable routing. However, the impact from the Division 1 and Division 3 failures has more of an impact on the CDF in the B loop cases since the SRVs require DC power from Division 1 or Division 3 in both units. With no AC power available from these divisions to provide power to the chargers (based on the postulated fire scenario failures), RPV depressurization capabilities are not available from the SRVs following battery depletion. As such, there are fewer overall success paths available when the RHRSW B loop is out of service given failures of both the Division 1 and Division 3 equipment compared to the RHRSW A loop case which still has RPV depressurization capabilities available via the SRVs in the corresponding postulated fire scenario that fails the Division 2 and Division 4 equipment.

The asymmetry described above is the major reason that the B loop case results in a higher CDF value than the A loop case. However, there is one additional asymmetry associated with the fire PRA that also leads to higher results when the B loop is out of service compared to the A loop. This asymmetry is described in Section A.3.2 of Attachment 3 of the LAR submittal and relates to the treatment of the fires initiating in the Remote Shutdown Room. Because of this asymmetrical treatment, a Remote Shutdown Room severe fire contributes a larger amount in the B loop case compared to the A loop case for both units. This can be noted via the inclusion of scenario IEFR-26-C as a significant contributor in the B loop cases, but not in the A loop cases in Tables A-6 through A-9 of Attachment 3 of the LAR submittal.

Similarly, the asymmetries related to Division 1 and 3 failures compared to Division 2 and 4 failures are also responsible for the higher internal events CDF values calculated for the B loop cases as compared to the A loop cases (as reported in Table 3.2-1 of Attachment 3 of the LAR submittal), but as noted the impact is to a lesser degree in the internal events model results than in the fire model results. Additionally, Section A.1 of Attachment 3 of the LAR submittal also provided a description of the internal events results for the A and B loop cases based on the risk contribution by functional sequence for both units. The most notable asymmetry described there is related to the fact that alternate injection from RHRSW goes through the RHR B loop in Unit 1, but through the RHR A loop in Unit 2. This does not have much of an impact on the overall CDF results, but does have an impact on the LOCA initiated sequences and more importantly the containment bypass sequences due to ISLOCA scenarios. This difference in the contribution from the ISLOCA scenarios results in the difference in the LERF results as reported in Tables 3.2-1 and 3.2-2 of Attachment 3 of the LAR submittal.

The results of both the internal events model results and the fire PRA model results were fully utilized to provide insights into the identification of the proposed compensatory measures that were included in the LAR submittal. From the internal events model, this included a detailed assessment as described in Appendix B of Attachment 3 of the LAR submittal. From the fire PRA model results, this included the identification of the important fire areas that specifically account for the asymmetries described above. Namely, the appropriate switchgear areas with elevated risks for the different configurations are clearly identified and the Remote Shutdown Room area is identified as a fire area of potential elevated risk when the B loop is out of service. This insight was also extended to the identified compensatory action number 6 where it was recommended that during the A loop outage, a briefing be performed highlighting the fact that some of the normally operated equipment from the remote shutdown panel will not be available (and remote operation of the B loop equipment may be required).

8. The compensatory measures, which are referenced as the tier 2 evaluation for key principle 4 of RG 1.177, identified in Section 4.2 of the LAR, Attachment 1, are vague and require clarification as to exactly what the commitment involves:

   a. Commitment #1 identifies that "adequate staffing" will be maintained onsite to respond to "unexpected conditions." The staff does not understand the scope and meaning of these terms. For example, it [is] unclear how "adequate staffing" will be determined and validated and what this commitment means in terms of numbers and disciplines of personnel.

   Response

   Staffing is governed by the normal work control process for outage conditions under which the RHRSW piping repairs would be performed and also for any unexpected emergent conditions. Therefore, ensuring adequate staffing in response to unexpected conditions is no longer considered a regulatory commitment and has been deleted.

   b. Commitment #2 identifies "elective" maintenance and "discretionary" maintenance, as well as "testing." The staff does not understand the scope of the two terms, and is unclear as to whether the commitment refers to all testing, or only "elective" or "discretionary" testing.

   Response

   Elective maintenance and discretionary maintenance are general terms that are defined in more detail in procedure WC-AA-106 as elective maintenance non-degraded and elective maintenance degraded, respectively. In general, elective maintenance involves enhancements to equipment that is fully capable of meeting its intended design function or performance criteria. Discretionary maintenance is maintenance on degraded but operable equipment, which involves engineering judgment as to the effect of the degradation, the scope of repairs necessary and the timing for the repairs. Testing refers to surveillance testing required by Technical Specifications, the Technical Requirements Manual, Inservice Inspection/Testing, etc., to verify that equipment is capable of performing its intended design function. These maintenance and testing activities will be prohibited by considering the affected systems as protected as defined in procedure OP-AA-108-117. The list of protected equipment will be controlled as part of the special procedure developed specifically to govern plant operation while in the extended AOTs.

   c. Subpart (a) Commitment #2 states that the proper standby alignment of RHRSW will be "ensured." The staff does not understand how this will be accomplished (e.g., by alignment verification, by performance of surveillance test, by flow testing).

   Response

   The RHRSW and ESW System alignments required to minimize the impact to plant safety during the extended AOTs will be established prior to entry into the work window and periodically verified during the work window in accordance with a check-off list contained in the special procedure developed specifically to govern plant operation while in the extended AOTs.

Additionally, flow balance verification testing will be performed in advance of the extended AOT for each RHRSW subsystem to demonstrate acceptable cooling water flow rates are maintained for all ESW system cooled equipment when the flow from both ESW loops is returned through one RHRSW return header. This flow test is a one-time test for each RHRSW subsystem, and is separate from the system alignment verification described above, but will be performed initially and once per 10 years thereafter, if required, to support future RHRSW piping repairs beyond the current plan of two refueling outages per unit. Completion of this flow balance verification testing will be a pre-requisite of the special procedure.

d. The staff also notes that Commitment #2 is poorly structured in that it puts some commitments in the opening paragraph, and others as detailed subparts (a) and (b). The licensee is requested to revise the structure of this commitment.

Response

The first part of compensatory measure #2 has been incorporated into the revised proposed TS markup for TS LCO 3.7.1.1, Action a.3 (see Attachment 3), and therefore, is no longer considered a regulatory commitment but a required action while in the TS LCO 3.7.1.1. The remaining portions of compensatory measure #2 have been revised as shown below and will be incorporated into the special procedure developed specifically to govern plant operation while in the extended AOTs. The second action has also been modified in content for consistency with the new proposed TS LCO 3.7.1.1, Actions a.3.a) and a.3.b).

1. The following action will be taken prior to entry into the proposed configuration:

    - Proper standby alignment of the operable RHRSW subsystem will be ensured prior to entry into the AOT to reduce the contribution from potential pre-initiator errors.

2. Also, the following actions will be taken prior to entry into the proposed configuration:

    - When the RHRSW subsystem A is inoperable to allow for repairs of the RHRSW A subsystem piping with Limerick Generating Station Unit 2 shutdown, reactor vessel head removed and reactor cavity flooded, the following equipment will be verified as available and protected as defined in procedure OP-AA-108-117:

        - o ESW loop A
        - o Unit 1 LPCI subsystems A and C
        - o D11, D13, and D23 4kV buses and emergency diesel generators
        - o Unit 1 Division 1 and Division 3 Safeguard DC

- When the RHRSW subsystem A is inoperable to allow for repairs of the RHRSW A subsystem piping with Limerick Generating Station Unit 1 shutdown, reactor vessel head removed and reactor cavity flooded, the following equipment will be verified as available and protected as defined in procedure OP-AA-108-117:

  - ESW loop A
  - Unit 2 LPCI subsystems A and C
  - D11, D21, and D23 4kV buses and emergency diesel generators
  - Unit 2 Division 1 and Division 3 Safeguard DC

- When the RHRSW subsystem B is inoperable to allow for repairs of the RHRSW B subsystem piping with Limerick Generating Station Unit 2 shutdown, reactor vessel head removed and reactor cavity flooded, the following equipment will be verified as available and protected as defined in procedure OP-AA-108-117:

  - ESW loop B
  - Unit 1 LPCI subsystems B and D
  - D12, D14, and D24 4kV buses and emergency diesel generators
  - Unit 1 Division 2 and Division 4 Safeguard DC

- When the RHRSW subsystem B is inoperable to allow for repairs of the RHRSW B subsystem piping with Limerick Generating Station Unit 1 shutdown, reactor vessel head removed and reactor cavity flooded, the following equipment will be verified as available and protected as defined in procedure OP-AA-108-117:

  - ESW loop B
  - Unit 2 LPCI subsystems B and D
  - D12, D22, and D24 4kV buses and emergency diesel generators
  - Unit 2 Division 2 and Division 4 Safeguard DC

e. Commitment #3 states that switchyard activities that "adversely affect risk exposure" are to be prohibited. The staff does not understand the scope of activities that are intended to be prohibited.

Response

Compensatory measure #3 has been redefined as shown below.

3. Activities in the switchyard that adversely affect risk exposure are those that have the potential to cause a total loss of offsite power. Therefore, the at-power unit switchyard will be protected in its entirety and equipment in the outage unit switchyard supporting operability of its offsite source will be protected during the RHRSW subsystem piping repairs. This equipment will be protected as defined in procedure OP-AA-108-117 and in accordance with station procedure OP-LG-108-

117. This will be controlled via the special procedure developed specifically to govern plant operation while in the extended AOTs.

f. Commitment #4 identifies "Operational Risk Activities" are to be "restricted." The staff does not understand the use of the term "restricted," nor does it understand the scope of "Operational Risk Activities."

Response

Operational Risk Activities (ORAs), as defined in procedure WC-AA-104, involve activities on risk significant systems that have the potential to derate the plant, i.e., cause a loss of planned generation. Typical ORAs involve: an activity that could cause equipment actuations that could cause loss of planned generation; instrument, fuse, or circuit board removal/installation; an activity that will cause a ½ scram or ½ trip; pressurization of common instrument sensing lines; placing of jumpers or lifting energized leads; an activity that could cause vibration or impact near operational risk sensitive equipment, etc. Such activities will be prohibited on the online unit during the RHRSW piping repairs. Exceptions to this must be approved by the senior plant management. This will be controlled as part of the special procedure developed specifically to govern plant operation while in the extended AOTs.

g. Commitment #7 identifies shift briefs and walkdowns to "reduce and manage" transient combustibles. The staff does not understand how the treatment of transient combustibles will be different than normal operations.

Response

Unattended transient combustibles and hot work will be prohibited in the areas listed below during the extended AOT. This will be controlled as part of the special procedure developed specifically to govern plant operation while in the extended AOTs.

For an 'A' RHRSW subsystem outage window:

- Fire Area 15, Unit 1 Division 2 (D12) safeguard 4kV switchgear room
- Fire Area 17, Unit 2 Division 2 (D22) safeguard 4kV switchgear room
- Fire Area 24, Main Control Room (ECCS B panel 10-C601 (Bay A, B))
- Fire Area 24, Main Control Room (ECCS B panel 20-C601 (Bay A, B))
- Fire Area 25, Auxiliary Equipment Room

For an 'B' RHRSW subsystem outage window:

- Fire Area 13, Unit 1 Division 1 (D11) safeguard 4kV switchgear room
- Fire Area 19, Unit 2 Division 1 (D21) safeguard 4kV switchgear room
- Fire Area 24, Main Control Room (ECCS A panel 10-C601 (Bay C, D, E, F))
- Fire Area 24, Main Control Room (ECCS A panel 20-C601 (Bay C, D, E, F))
- Fire Area 25, Auxiliary Equipment Room
- Fire Area 26, Remote Shutdown Panel

9. The following compensatory measures have been historically used to help ensure continued safe operation of plants during extended EDG outages. Please provide a discussion regarding your consideration of the following potential compensatory measures for LGS:

   a. Avoiding scheduling of this planned maintenance during seasons when the probability of grid stress conditions are high or forecasted to be high.

      Response

      The proposed LAR is intended to support repair of one RHRSW subsystem only with one reactor unit shutdown, the reactor vessel head removed and reactor cavity flooded. Rarely, if ever, will these conditions exist outside of the scheduled refuel outage at the end of each fuel cycle. Limerick refuel outages are purposely scheduled to occur in the later winter, early spring time frame to align with low grid stress conditions. In the unlikely event that an unplanned reactor shutdown would necessitate fuel movement, use of the extended AOT would not likely be possible due to the significant amount of pre-outage planning and mobilization effort that would be required to execute an RHRSW piping work window.

   b. Contacting the system load dispatcher prior to starting this maintenance to ensure no significant grid perturbations are expected during the extended AOT.

      Response

      Contacting the system load dispatcher prior to starting the maintenance window and during the early stages of the window allows for the forecast of grid instability to be considered in the decision to either continue into the maintenance window or to halt the work prior to the start of pipe removal. Once the maintenance window extends beyond the start of pipe removal, maintaining contact with the system load dispatcher serves to heighten the awareness of the operators to the potential for a loss of off-site power due to grid instability. This will be controlled by the special procedure.

   c. Verifying that the required systems, subsystems, trains, components, and devices that depend on the remaining EDG(s) are operable and positive measures will be provided to preclude subsequent testing or maintenance activities on these systems, subsystems, trains, components, and devices.

      Response

      The new proposed TS LCO 3.7.1.1, Actions a.3.a) and a.3.b), and the compensatory measures described in the LAR and in the responses to these RAI questions identified the equipment that is required to be protected. Therefore, no additional equipment need be maintained operable or protected.

10. The LAR, Attachment 1, states that planned RHRSW maintenance will begin with the 2012, LGS Unit 1 refueling outage. Please provide more detail regarding the planned work schedule for the currently-identified RHRSW system repairs. How will the use of the

extended AOT (including the EDG AOT) be managed beyond the period of the currently contemplated repairs?

Response

The proposed LAR is intended only to support replacement of the non-isolable portions of the common unit RHRSW return headers. Tentative station planning and funding will allow for replacement of 100 percent of this piping that is accessible over the next two refuel outages for each reactor unit starting after the Unit 2 refueling outage in 2011, i.e., 'A' RHRSW return loop in the 2012 and 2014 Unit 1 refueling outages, and the 'B' RHRSW return loop in the 2013 and 2015 Unit 2 refueling outages. The maintenance window scope for each refuel outage has been defined based on the amount of common RHRSW return piping that could be replaced in approximately five days allowing the remaining two days of the extended AOT to be reserved for unexpected delays. The controls and limitations necessary to support the extended AOTs, as discussed in the original LAR and in this RAI response, would be implemented for each of the targeted refueling outages in the same manner. Any repairs conducted after these dates requiring the use of the extended AOT would be managed identically to these repairs, requiring the same compensatory actions, entry conditions and use of the same special procedure to govern line-up and operations of the RHRSW and ESW systems.

11. In the LAR, Attachment 1, Section 4.2, Compensatory Measure Item 2b, the licensee states that the availability of EDG D11, D21, and D23 will be verified when RHRSW subsystem A will be unavailable. Explain the basis for not requiring verification of the availability of EDG D13 when RHRSW system A will be unavailable.

Response

This compensatory measure was based on providing power to all ESW and RHRSW pumps in operable or available flow loops. From a review of UFSAR Table 8.3-3, it can be seen that ESW pumps are powered by the D11, D12, D23 and D24 diesels. RHRSW pumps are powered by the D11, D12, D21 and D22 diesels. The D13 diesel does not power either an ESW or RHRSW pump. Therefore, during a Unit 1 outage, D13 is not needed to meet TS requirements for Unit 2 or to maximize cooling system flows. Similarly, during a Unit 2 outage, with the 'B' RHRSW loop out of service, the D22 diesel is not needed to meet TS requirements for Unit 1 because it does not power an ESW pump and the RHRSW pump it powers is in the 'B' loop, which would be out of service.

12. Specifically regarding the EDGs, please describe how defense-in-depth will be maintained. For example, are there any contingency backup provisions that can be staged for cooling the EDGs made inoperable by the ESW alignment or, alternatively, is a supplemental AC source, with the capability of handling station blackout and loss-of-offsite power loads, available to supplement the existing EDGs during the proposed extended 7-day AOT?

Response

With one RHRSW return header disabled for piping replacement, the associated ESW loop will be aligned to the operable RHRSW return header such that both ESW loops and one RHRSW loop would rely on the operable RHRSW return header for a flow path to the spray pond. The possibility of a single active failure rendering the ESW System inoperable will be eliminated by de-energizing the ESW loop return isolation motor operated valves in their safe position. Although the ESW System will meet single active failure criteria in this alternate alignment, the ESW System no longer meets the intent of GDC 44 for suitable redundancy and separation to prevent impairment of safety function assuming a passive failure. For this reason that ESW loop that is not aligned to its normal RHRSW return header will be administratively declared inoperable and the TS action for a single ESW loop inoperable would be entered. Associated components cooled by the inoperable ESW loop would also be administratively declared inoperable.

As discussed in the LAR, Section 4.1, the ESW loop and associated components cooled by the ESW loop would be considered administratively inoperable but would remain aligned for automatic initiation. Flow balance testing performed prior to the first use of the extended AOT for each RHRSW subsystem will demonstrate that the ESW loop not aligned to its normal RHRSW return header would be capable of providing the minimum required cooling water flow rates to all components required for safe shutdown. As such, the administratively inoperable ESW loop and associated components would be considered capable of performing their intended design function, i.e., they would be expected to operate on demand and provide the required cooling and power. Given this degree of redundancy that is maintained relative to the permanently installed standby AC power sources, use of supplemental AC sources, that must be considered to be less reliable than the installed equipment, is not warranted.

13. For the compensatory measures identified in question 1(c) that are included in the TS and/or controlled by other mechanisms, how will operations personnel confirm that the required compensatory actions are established and in effect? Will a completed, controlled checklist of compensatory actions be made available in the Control Room? Will a special procedure be used?

Response

Compensatory measures specifically included in TS, required system alignments and alignment verifications and other actions credited to minimize the impact to plant safety during the extended AOTs will be contained in a special procedure. The special procedure will control such activities as:

- new proposed Actions a.3.a) and a.3.b) required by revised TS LCO 3.7.1.1,
- identifying the equipment to protect per procedure OP-AA-108-117 during the work activity (i.e., RHRSW piping repairs),
- verifying that the ESW flow balance verification testing has been performed prior to the work activity,
- Contacting the load dispatcher prior to and during early stages of the work activity to determine grid stability,

- guidance to alert operators of the need to remote manually align the spray network isolation valves from the winter bypass flow path to the spray networks, and
- revised compensatory measures described in Attachment 4 to this letter.

This special procedure will be used in conjunction with existing plant procedures to provide control room operators with the necessary guidance to safely manage the units during the extended AOTs.

14. Please identify any changes to procedures or any new procedures that will be required to support the proposed LAR.

Response

As discussed above, a special procedure will be developed to implement the compensatory measures specifically included in TS, required system alignments and alignment verifications and other actions credited to minimize the impact to plant safety during the extended AOTs. In addition, a routine test will be developed to perform the ESW flow balance verification testing that will be a pre-requisite of the special procedure (see response to RAI 8.c). Changes to ESW and RHRSW system operating procedures that interface with this special procedure are also anticipated.

15. In the LAR, Section 5.1 of Attachment 1 indicates that the emergency operating procedures (EOPs) will remain viable under the 7-day AOT configuration. How was/will the EOP sufficiency be validated?

Response

The ESW loop not aligned to its normal RHRSW return header and the supported EDGs will remain capable of performing their design function although considered administratively inoperable per TS. Therefore, plant equipment that relies on ESW and the EDGs for either cooling and/or standby AC power to support emergency core cooling system operation will remain capable of performing their intended design function as directed by the emergency operating procedures. During repairs to the RHRSW subsystem piping, the EOPs will be impacted in that only one residual heat removal (RHR) heat exchanger will be available for decay heat removal; however, this configuration remains within the design basis of the plant. Additionally, the planned configuration for repairs ensures that both ESW loops and their associated EDGs will be available to perform their intended design function, and therefore, successfully mitigate any accidents or transients.

16. In the LAR, Section 4.1 of Attachment 1 describes manual alignment of the spray pond sprays. How will manual alignment of spray pond sprays be addressed? This is not a compensatory measure and is not included in that listing. What cue tells the operator that this action is required? Is there any time constraint? How will the operator know whether the realignment was a success? What is the recovery action? How long does the operator have to recover?

Response

For the ESW loop that is not aligned to its normal RHRSW return header, start of an ESW pump will not result in automatic alignment of the associated spray network isolation valves from the winter bypass flow path to the spray networks. Operator action will be required to align these spray network isolation valves to the "spray" position when required. Alignment of the spray network isolation valves is accomplished from hand switches in the main control room. Position indication for all motor operated spray network isolation and winter bypass valves is provided in the main control room to aid operators in verifying proper system alignment and control. The special procedure that will govern system alignments and actions necessary to support use of the extended AOTs will include guidance to alert operators of the need to remote manually align the spray network isolation valves of the cross connected ESW loop upon start of an associated ESW pump.

The spray pond thermal performance analysis for the limiting design basis event (dual unit shutdown from 100% power) demonstrates that the peak spray pond temperature does not occur until at least 18 hours following the start of the event. Initial spray pond conditions for the analysis include an initial water temperature of 88°F. As discussed previously, the proposed LAR is intended to support repair of one RHRSW subsystem only with one reactor unit shutdown. In addition, the LGS refuel outages are purposely scheduled to occur in the late winter/early spring time frame when the spray pond is expected to be much cooler (spray pond water temperatures during this period are significantly below 88°F) and total spray pond heat load would be much lower. Thus, the period of time available to the operators to realign the spray network isolation valves of the cross connected ESW loop upon start of an associated ESW pump is several days. In the event that spray valves are not properly aligned, the ESW flow will still return to the spray pond through the winter bypass line. This will ensure that the ESW pumps do not operate in a dead headed condition and ESW cooling flows will be delivered.

17. The LAR, Attachment 1, Sections 4.1, 4.2, as well as, Attachment 3, Section 5.4, describes station provisions for "Alternate Remote Shutdown." Are there any design-basis accidents that would make "Alternate Remote Shutdown" impossible due to radiation or other extreme environmental conditions in the equipment areas or in the ingress or egress pathways?

Response

The ESW and RHRSW Systems are designed for operation from alternate locations (remote shutdown panel and auxiliary switchgear room) to support plant shutdown in the event that the main control room becomes uninhabitable due to fire or toxic gas release. Such plant events that necessitate control room evacuation are not postulated to occur coincident with the design basis accidents that the plant must be designed to mitigate. Therefore, the general plant areas that must be accessed to remotely operate ESW, RHRSW, and RHR pumps and valves will be accessible.

REFERENCES

1. Letter from Pamela B. Cowan (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "License Amendment Request, Proposed Changes to Technical Specifications Sections 3.5.1, 3.6.2.3, 3.7.1.1, 3.7.1.2 and 3.8.1.1 to Extend the Allowed Outage Times," dated March 19, 2010.

2. Letter from Peter Bamford, U.S. Nuclear Regulatory Commission, to Michael J. Pacilio, Exelon Nuclear, "Limerick Generating Station, Units 1 and 2 - Request for Additional Information Regarding Proposed Technical Specification Allowed Outage Time Extensions to Support Residual Heat Removal Service Water (RHRSW) Maintenance (TAC Nos. ME3551 And ME3552)," dated September 21, 2010.

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

4. NEI 00-01, "Guidance for Post Fire Safe Shutdown Circuit Analysis," Revision 2, May 2009

ATTACHMENT 2

License Amendment Request

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

Proposed Technical Specification Allowed Outage Time Extensions to Support Residual Heat Removal Service Water Maintenance

Response to Request for Additional Information No. 2

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION NO. 2 PROPOSED TECHNICAL SPECIFICATION ALLOWED OUTAGE TIME EXTENSIONS TO SUPPORT RESIDUAL HEAT REMOVAL SERVICE WATER MAINTENANCE

In Reference 1, Exelon Generation Company, LLC (Exelon) requested changes to the Technical Specifications (TS), Appendix A of Operating License Nos. NPF-39 and NPF-85 for Limerick Generating Station (LGS), Units 1 and 2, respectively. The proposed changes would extend the TS allowed outage time (AOT) for the Unit 1 and Unit 2 Suppression Pool Cooling (SPC) mode of the Residual Heat Removal (RHR) system, the Residual Heat Removal Service Water (RHRSW) system, the Emergency Service Water (ESW) system, and the A.C. Sources - Operating (Emergency Diesel Generators) from 72 hours to seven (7) days in order to allow for repairs of the RHRSW system piping.

The NRC reviewed the license amendment request and identified the need for additional information in order to complete its evaluation of the amendment request. On September 28, 2010, draft questions were sent to Exelon to ensure that the questions were understandable, the regulatory basis for the questions was clear, and to determine if the information was previously docketed. In Reference 2, the NRC formally issued the request for additional information (RAI). The questions are restated below along with Exelon's responses.

1. The LAR, Attachment 1, compensatory measure 4.2.2.b provides a listing of the various equipment whose availability is to be verified during the extended AOT.

   Please define "availability" in the above context and state whether this equipment will be immediately available for use if called upon.

   Response

   Compensatory Measure 4.2.2.b in Attachment 1 of the original submittal (Reference 1) identifies the subsystems and components that would be considered to be available to perform their design function although considered administratively inoperable. In the context of the statement in question the term "available" implies that the subsystem or component would remain aligned for automatic initiation and would be considered to be capable of performing their design function. Flow balance testing would be performed prior to the first use of the extended AOT for each RHRSW subsystem to demonstrate that the ESW loop not aligned to its normal RHRSW return header would be capable of providing the minimum required cooling water flow rates to all components required for safe shutdown.

2. In the LAR, Attachment 1, Section 4.3.2, "Defense in Depth Philosophy," under the subtopic for 'system redundancy' the submittal describes the capability of the operable train and the compensatory measures to assure the availability of the operable train. But the section does not discuss the subject matter of the subtopic, i.e. system redundancy, independence and diversity.

Discuss the available systems that may not be operable but do provide some measure of redundancy, independence and diversity and discuss their capability during an extended AOT. Discuss any other systems, safety related or non safety related, which also can provide some measure of redundancy, independence and diversity for an extended AOT.

Response

With the exception of the non-outage RHR heat exchanger and the two RHRSW pumps associated with the RHRSW subsystem that is disabled for pipe replacement, equipment and subsystems required to comply with plant TS for the expected plant conditions (one unit in refuel) will either be operable as defined by TS or will be available as defined in the response to RAI Question #1 above to perform its design function as described in the UFSAR. As discussed in the license amendment request (LAR), the heat removal capability of one operable RHRSW subsystem with two RHRSW pumps and one RHR heat exchanger is sufficient to mitigate all design basis events.

3. The LAR, Attachment 1, Section 3.0, states that the ESW system is designed to supply cooling water to the following safety related equipment:

   a. RHR motor oil coolers
   b. RHR pump compartment unit coolers
   c. Core spray pump compartment unit coolers
   d. Control room chillers
   e. Standby diesel generator heat exchangers
   f. Reactor Core Isolation Cooling (RCIC) pump compartment unit coolers
   g. High-Pressure Coolant Injection (HPCI) pump compartment unit coolers
   h. Spent fuel pools (makeup water)

   The LAR also states that when the 'A' RHRSW loop is inoperable, the 'A' ESW loop will be declared inoperable and associated components cooled by the 'A' ESW loop will be declared inoperable, as required by LGS TS 3/4.7.1.2, Action a.3. A similar statement can be made for the 'B' RHRSW loop, 'B' ESW loop and associated components cooled by the 'B' ESW loop. Therefore, the above listed components that are cooled by their respective ESW loop are inoperable when the associated ESW loop is inoperable.

   The LAR accounts for the inoperability of the RHR motor oil coolers and pump compartment unit coolers, core spray pump compartment unit coolers and diesel generator heat exchangers. However, the LAR does not discuss the effect of inoperability of the ESW loops upon control room chillers, RCIC and HPCI pump compartment unit coolers and spent fuel pool makeup water. Discuss the effect of inoperability of each ESW loop upon the above listed components and whether the associated TSs are, or are not, affected.

Response

Inoperability of ESW does not affect operability of either the HPCI or RCIC systems. While ESW supplies cooling water to the room coolers in the HPCI and RCIC pump rooms, the room coolers are not required for either HPCI or RCIC to perform its design basis function. Equipment required for functioning of the HPCI and RCIC systems have been qualified to temperatures exceeding the maximum temperatures expected for operation of the HPCI and RCIC systems without cooling provided by the room coolers. Even though the room coolers are not required for HPCI/RCIC operability determination, since either loop being declared inoperable will be available and protected, the affected loop would be expected to supply cooling water to its associated room coolers as required.

Inoperability of an ESW loop does not affect operability of the Main Control Room Chillers. While Limerick has two Main Control Room Chillers (one supplied from each ESW loop), the chillers are not governed by any TS. Therefore, a chiller would not be declared inoperable as a result of the associated ESW loop being administratively declared inoperable. Since either loop being declared inoperable will be available and protected, the affected loop would be expected to supply cooling water to its associated chiller as required.

Similarly, the operability of the spent fuel makeup function of ESW will not be affected by administratively declaring a loop of ESW inoperable, since spent fuel pool makeup is not governed by any TS. As described above, the loop of ESW being administratively declared inoperable will be available and will be a protected system during the extended LCO. Therefore, the affected loop of ESW will still be capable of providing make-up water as required.

4. With 'A' RHRSW subsystem inoperable and drained for maintenance (Unit 2 operating and Unit 1 shutdown), the LAR states in Attachment 1, paragraph 4.1.b, "Even though the ESW system meets single active failure criteria in this alignment, it will not be single passive failure proof. As a result, the ESW system will not meet the requirements of [General Design Criteria] GDC 44..."

   Discuss the single passive failures under consideration that cause the failure to meet GDC 44 requirements.

   <u>Response</u>

   The only passive failures that would result in failure to meet GDC 44 criteria are described below.

   With the "A" loop of RHRSW out of service and drained, a disc separation in the 012-0120B valve that blocked flow would result in a failure to meet GDC 44 criteria. Likewise, a failure of the "B" loop RHRSW return piping that resulted in flow blockage (i.e.., crimping of the line) would result in a failure to meet GDC 44 criteria.

   With the "B" loop of RHRSW out of service and drained, a disc separation in the 012-0120A valve that blocked flow would result in a failure to meet GDC 44 criteria. Likewise, a failure of the "A" loop RHRSW return piping that resulted in flow blockage (i.e., crimping of the line) would result in a failure to meet GDC 44 criteria.

Both disc separation of the 012-120A(B) valve and failure of the RHRSW return loop piping are considered extremely unlikely events. The 012-0120A(B) valves are stainless steel butterfly valves. The most likely cause of disc separation in raw water systems is valve stem or stem nut corrosion, which is mitigated by the stainless steel material. Likewise, failure of the RHRSW return piping is considered an extremely unlikely event. This piping is either contained in a missile proof, seismic I structure, or is buried. Therefore, tornado missiles or seismic events would not result in failure. Since the line is carbon steel, it is subject to leakage due to corrosion. However, leakage will not result in complete flow blockage. Additionally, since this is the return loop, system leakage would not impair flows to components cooled by ESW or RHRSW, or the ability to transfer heat from those components. Leakage from the return piping could affect long term spray pond inventory. However, there are multiple systems and flow paths available to provide make-up to the Spray Pond, not dependant on the RHRSW system return piping.

REFERENCES

1. Letter from Pamela B. Cowan (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "License Amendment Request, Proposed Changes to Technical Specifications Sections 3.5.1, 3.6.2.3, 3.7.1.1, 3.7.1.2 and 3.8.1.1 to Extend the Allowed Outage Times," dated March 19, 2010.

2. Letter from Peter Bamford, U.S. Nuclear Regulatory Commission, to Michael J. Pacilio, Exelon Nuclear, "Limerick Generating Station, Units 1 and 2 - Request for Additional Information Regarding Proposed Technical Specification Allowed Outage Time Extensions to Support Residual Heat Removal Service Water (RHRSW) Maintenance (TAC Nos. ME3551 And ME3552)," dated September 30, 2010.

ATTACHMENT 3

License Amendment Request

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

Proposed Technical Specification Allowed Outage Time Extensions to Support Residual Heat Removal Service Water Maintenance

Revised Proposed Technical Specifications Pages

Unit 1 TS Pages

3/4 6-16
3/4 7-1
3/4 7-3
3/4 8-1
3/4 8-2

Unit 2 TS Pages

3/4 6-16
3/4 7-1
3/4 7-3
3/4 8-1
3/4 8-2

SUPPRESSION POOL COOLING

LIMITING CONDITION FOR OPERATION

3.6.2.3 The suppression pool cooling mode of the residual heat removal (RHR) system shall be OPERABLE with two independent loops, each loop consisting of:

a. One OPERABLE RHR pump, and

b. An OPERABLE flow path capable of recirculating water from the suppression chamber through an RHR heat exchanger.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

a. With one suppression pool cooling loop inoperable, restore the inoperable loop to OPERABLE status within 72 hours** or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. With both suppression pool cooling loops inoperable, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN* within the next 24 hours.

SURVEILLANCE REQUIREMENTS

4.6.2.3 The suppression pool cooling mode of the RHR system shall be demonstrated OPERABLE:

a. In accordance with the Surveillance Frequency Control Program by verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

b. By verifying that each of the required RHR pumps develops a flow of at least 10,000 gpm on recirculation flow through the flow path including the RHR heat exchanger and its associated closed bypass valve, the suppression pool and the full flow test line when tested pursuant to Specification 4.0.5.

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* Whenever both RHR subsystems are inoperable, if unable to attain COLD SHUTDOWN as required by this ACTION, maintain reactor coolant temperature as low as practical by use of alternate heat removal methods.

> INSERT A

INSERT [A] (SPC 3.6.2.3.a)

** During the extended 7-day Allowed Outage Time (AOT) specified by TS LCO 3.7.1.1, Action a.3.a) or a.3.b) to allow for RHRSW subsystem piping repairs, the 72-hour AOT for one inoperable suppression pool cooling loop may also be extended to 7 days for the same 7-day period.

3/4.7.1 SERVICE WATER SYSTEMS

RESIDUAL HEAT REMOVAL SERVICE WATER SYSTEM - COMMON SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.1 At least the following independent residual heat removal service water (RHRSW) system subsystems, with each subsystem comprised of:

a. Two OPERABLE RHRSW pumps, and

b. An OPERABLE flow path capable of taking suction from the RHR service water pumps wet pits which are supplied from the spray pond or the cooling tower basin and transferring the water through one Unit 1 RHR heat exchanger,

shall be OPERABLE:

a. In OPERABLE CONDITIONS 1, 2, and 3, two subsystems.

b. In OPERABLE CONDITIONS 4 and 5, the subsystem(s) associated with systems and components required OPERABLE by Specification 3.4.9.2, 3.9.11.1, and 3.9.11.2.

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

ACTION:

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

1. With one RHRSW pump inoperable, restore the inoperable pump to OPERABLE status within 30 days, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With one RHRSW pump in each subsystem inoperable, restore at least one of the inoperable RHRSW pumps to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

3. With one RHRSW subsystem otherwise inoperable, restore the inoperable subsystem to OPERABLE status with at least one OPERABLE RHRSW pump within 72 hours, or be in at least HOT SHUTDOWN within the next 12 hours, and in COLD SHUTDOWN within the following 24 hours. , unless otherwise specified in a) or b) below,

INSERT B

4. With both RHRSW subsystems otherwise inoperable, restore at least one subsystem to OPERABLE status within 8 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN* within the following 24 hours.

---

*Whenever both RHRSW subsystems are inoperable, if unable to attain COLD SHUTDOWN as required by the ACTION, maintain reactor coolant temperature as low as practical by use of alternate heat removal methods.

INSERT [B] (RHRSW 3.7.1.1.a.3)

a) When the 'A' RHRSW subsystem is inoperable to allow for repairs of the 'A' RHRSW subsystem piping, with Limerick Generating Station Unit 2 shutdown, reactor vessel head removed and reactor cavity flooded, the 72-hour Allowed Outage Time may be extended to 7 days once every other calendar year with the following compensatory measures established:

1) The following systems and subsystems will be protected in accordance with applicable station procedures:
   - 'B' RHRSW subsystem
   - 'B' ESW loop
   - 'B' and 'D' RHR subsystems
   - D12, D14, D22, and D24 4kV buses and emergency diesel generators
   - Division 2 and Division 4 Safeguard DC, and

2) The 'A' and 'B' loop of ESW return flow shall be aligned to the operable 'B' RHRSW return header only. The ESW return valves to the 'B' RHRSW return header (i.e., HV-11-015A and HV-11-015B) will be administratively controlled in the open position and de-energized prior to entering the extended AOT. The ESW return valves to the 'A' RHRSW return header (i.e., HV-11-011A and HV-11-011B) will be administratively controlled in the closed position and de-energized as part of the work boundary.

b) When the 'B' RHRSW subsystem is inoperable to allow for repairs of the 'B' RHRSW subsystem piping, with Limerick Generating Station Unit 2 shutdown, reactor vessel head removed and reactor cavity flooded, the 72-hour Allowed Outage Time may be extended to 7 days once every other calendar year with the following compensatory measures established:

1) The following systems and subsystems will be protected in accordance with applicable station procedures:
   - 'A' RHRSW subsystem
   - 'A' ESW loop
   - 'A' and 'C' RHR subsystems
   - D11, D13, D21, and D23 4kV buses and emergency diesel generators
   - Division 1 and Division 3 Safeguard DC, and

2) The 'A' and 'B' loop of ESW return flow shall be aligned to the operable 'A' RHRSW return header only. The ESW return valves to the 'A' RHRSW return header (i.e., HV-11-011A and HV-11-011B) will be administratively controlled in the open position and de-energized prior to entering the extended AOT. The ESW return valves to the 'B' RHRSW return header (i.e., HV-11-015A and HV-11-015B) will be administratively controlled in the closed position and de-energized as part of the work boundary.

PLANT SYSTEMS

EMERGENCY SERVICE WATER SYSTEM - COMMON SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.2 At least the following independent emergency service water system loops, with each loop comprised of:

a. Two OPERABLE emergency service water pumps, and

b. An OPERABLE flow path capable of taking suction from the emergency service water pumps wet pits which are supplied from the spray pond or the cooling tower basin and transferring the water to the associated Unit 1 and common safety-related equipment,

shall be OPERABLE:

a. In OPERATIONAL CONDITIONS 1, 2, and 3, two loops.

b. In OPERATIONAL CONDITIONS 4, 5, and *, one loop.

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

ACTION:

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

1. With one emergency service water pump inoperable, restore the inoperable pump to OPERABLE status within 45 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With one emergency service water pump in each loop inoperable, restore at least one inoperable pump to OPERABLE status within 30 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

3. With one emergency service water system loop otherwise inoperable, declare all equipment aligned to the inoperable loop inoperable**, restore the inoperable loop to OPERABLE status with at least one OPERABLE pump within 72 hours/ or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. #

*When handling irradiated fuel in the secondary containment.
**The diesel generators may be aligned to the OPERABLE emergency service water system loop provided confirmatory flow testing has been performed. Those diesel generators no aligned to the OPERABLE emergency service water system loop shall be declared inoperable and the actions of 3.8.1.1 taken.

> INSERT C

INSERT [C] (ESW 3.7.1.2.a.3)

\# During the extended 7-day Allowed Outage Time (AOT) specified by TS LCO 3.7.1.1, Action a.3.a) or a.3.b) to allow for RHRSW subsystem piping repairs, the 72-hour AOT for one inoperable emergency service water system loop may also be extended to 7 days for the same 7-day period.

3/4.8.1 A.C. SOURCES

A.C. SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system, and

b. Four separate and independent diesel generators, each with:

   1. A separate day tank containing a minimum of 250 gallons of fuel,

   2. A separate fuel storage system containing a minimum of 33,500 gallons of fuel, and

   3. A separate fuel transfer pump.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

a. With one diesel generator of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 24 hours and at least once per 7 days thereafter. If the diesel generator became inoperable due to any cause other than an inoperable support system, an independently testable component, or preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining operable diesel generators by performing Surveillance Requirement 4.8.1.1.2.a.4 for one diesel generator at a time, within 24 hours, unless the absence of any potential common-mode failure for the remaining diesel generators is determined. Restore the inoperable diesel generator to OPERABLE status within 30 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. See also ACTION e.

b. With two diesel generators of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If either of the diesel generators became inoperable due to any cause other than an inoperable support system, an independently testable component, or preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining diesel generators by performing Surveillance Requirement 4.8.1.1.2.a.4 for one diesel generator at a time, within 8 hours, unless the absence of any potential common-mode failure for the remaining diesel generators is determined. Restore at least one of the inoperable diesel generators to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. See also ACTION e.

(*)

> INSERT D

INSERT [D] (EDGs 3.8.1.1.b)

* During the extended 7-day Allowed Outage Time (AOT) specified by TS LCO 3.7.1.1, Action a.3.a) or a.3.b) to allow for RHRSW subsystem piping repairs, the 72-hour AOT for two inoperable diesel generators may also be extended to 7 days for the same 7-day period.

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

e. In addition to the ACTIONS above:

1. For two train systems, with one or more diesel generators of the above required A.C. electrical power sources inoperable, verify within 2 hours and at least once per 12 hours thereafter that at least one of the required two train system subsystem, train, components, and devices is OPERABLE and its associated diesel generator is OPERABLE. Otherwise, restore either the inoperable diesel generator or the inoperable system subsystem to an OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. *

2. For the LPCI systems, with two or more diesel generators of the above required A.C. electrical power sources inoperable, verify within 2 hours and at least once per 12 hours thereafter that at least two of the required LPCI system subsystems, trains, components, and devices are OPERABLE and its associated diesel generator is OPERABLE. Otherwise, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

This ACTION does not apply for those systems covered in Specifications 3.7.1.1. and 3.7.1.2.

\> INSERT E

INSERT [E] (EDGs 3.8.1.1.e.1)

* During the extended 7-day Allowed Outage Time (AOT) specified by TS LCO 3.7.1.1, Action a.3.a) or a.3.b) to allow for RHRSW subsystem piping repairs, the 72-hour AOT may also be extended to 7 days for the same 7-day period.

SUPPRESSION POOL COOLING

LIMITING CONDITION FOR OPERATION

3.6.2.3 The suppression pool cooling mode of the residual heat removal (RHR) system shall be OPERABLE with two independent loops, each loop consisting of:

a. One OPERABLE RHR pump, and

b. An OPERABLE flow path capable of recirculating water from the suppression chamber through an RHR heat exchanger.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

a. With one suppression pool cooling loop (**) inoperable, restore the inoperable loop to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. With both suppression pool cooling loops inoperable, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN* within the next 24 hours.

SURVEILLANCE REQUIREMENTS

4.6.2.3 The suppression pool cooling mode of the RHR system shall be demonstrated OPERABLE:

a. In accordance with the Surveillance Frequency Control Program by verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

b. By verifying that each of the required RHR pumps develops a flow of at least 10,000 gpm on recirculation flow through the flow path including the RHR heat exchanger and its associated closed bypass valve, the suppression pool and the full flow test line when tested pursuant to Specification 4.0.5.

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*Whenever both RHR subsystems are inoperable, if unable to attain COLD SHUTDOWN as required by this ACTION, maintain reactor coolant temperature as low as practical by use of alternate heat removal methods.

> INSERT A

INSERT [A] (SPC 3.6.2.3.a)

** During the extended 7-day Allowed Outage Time (AOT) specified by TS LCO 3.7.1.1, Action a.3.a) or a.3.b) to allow for RHRSW subsystem piping repairs, the 72-hour AOT for one inoperable suppression pool cooling loop may also be extended to 7 days for the same 7-day period.

3/4.7 PLANT SYSTEMS

3/4.7.1 SERVICE WATER SYSTEMS

RESIDUAL HEAT REMOVAL SERVICE WATER SYSTEM - COMMON SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.1 At least the following independent residual heat removal service water (RHRSW) system subsystems, with each subsystem comprised of:

a. Two OPERABLE RHRSW pumps, and

b. An OPERABLE flow path capable of taking suction from the RHR service water pumps wet pits which are supplied from the spray pond or the cooling tower basin and transferring the water through one Unit 2 RHR heat exchanger,

shall be OPERABLE:

a. In OPERATIONAL CONDITIONS 1, 2, and 3, two subsystems.

b. In OPERATIONAL CONDITIONS 4 and 5, the subsystem(s) associated with systems and components required OPERABLE by Specification 3.4.9.2, 3.9.11.1, and 3.9.11.2.

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

ACTION:

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

1. With one RHRSW pump inoperable, restore the inoperable pump to OPERABLE status within 30 days, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With one RHRSW pump in each subsystem inoperable, restore at least one of the inoperable RHRSW pumps to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

3. With one RHRSW subsystem otherwise inoperable, restore the inoperable subsystem to OPERABLE status with at least one OPERABLE RHRSW pump within 72 hours, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. , unless otherwise specified in a) or b) below,

INSERT B

4. With both RHRSW subsystems ~~otherwise~~ inoperable, restore at least one subsystem to OPERABLE status within 8 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN* within the following 24 hours.

*Whenever both RHRSW subsystems are inoperable, if unable to attain COLD SHUTDOWN as required by this ACTION, maintain reactor coolant temperature as low as practical by use of alternate heat removal methods.

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INSERT [B] (RHRSW 3.7.1.1.a.3)

a) When the 'A' RHRSW subsystem is inoperable to allow for repairs of the 'A' RHRSW subsystem piping, with Limerick Generating Station Unit 1 shutdown, reactor vessel head removed and reactor cavity flooded, the 72-hour Allowed Outage Time may be extended to 7 days once every other calendar year with the following compensatory measures established:

1) The following systems and subsystems will be protected in accordance with applicable station procedures:
   - 'B' RHRSW subsystem
   - 'B' ESW loop
   - 'B' and 'D' RHR subsystems
   - D12, D22, and D24 4kV buses and emergency diesel generators
   - Division 2 and Division 4 Safeguard DC, and

2) The 'A' and 'B' loop of ESW return flow shall be aligned to the operable 'B' RHRSW return header only. The ESW return valves to the 'B' RHRSW return header (i.e., HV-11-015A and HV-11-015B) will be administratively controlled in the open position and de-energized prior to entering the extended AOT. The ESW return valves to the 'A' RHRSW return header (i.e., HV-11-011A and HV-11-011B) will be administratively controlled in the closed position and de-energized as part of the work boundary.

b) When the 'B' RHRSW subsystem is inoperable to allow for repairs of the 'B' RHRSW subsystem piping, with Limerick Generating Station Unit 1 shutdown, reactor vessel head removed and reactor cavity flooded, the 72-hour Allowed Outage Time may be extended to 7 days once every other calendar year with the following compensatory measures established:

1) The following systems and subsystems will be protected in accordance with applicable station procedures:
   - 'A' RHRSW subsystem
   - 'A' ESW loop
   - 'A' and 'C' RHR subsystems
   - D11, D21, and D23 4kV buses and emergency diesel generators
   - Division 1 and Division 3 Safeguard DC, and

2) The 'A' and 'B' loop of ESW return flow shall be aligned to the operable 'A' RHRSW return header only. The ESW return valves to the 'A' RHRSW return header (i.e., HV-11-011A and HV-11-011B) will be administratively controlled in the open position and de-energized prior to entering the extended AOT. The ESW return valves to the 'B' RHRSW return header (i.e., HV-11-015A and HV-11-015B) will be administratively controlled in the closed position and de-energized as part of the work boundary.

3.7.1.2 At least the following independent emergency service water system loops, with each loop comprised of:

a. Two OPERABLE emergency service water pumps, and

b. An OPERABLE flow path capable of taking suction from the emergency service water pumps wet pits which are supplied from the spray pond or the cooling tower basin and transferring the water to the associated Unit 2 and common safety-related equipment,

shall be OPERABLE:

a. In OPERATIONAL CONDITIONS 1, 2, and 3, two loops.

b. In OPERATIONAL CONDITIONS 4, 5, and *, one loop.

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

ACTION:

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

1. With one emergency service water pump inoperable, restore the inoperable pump to OPERABLE status within 45 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With one emergency service water pump in each loop inoperable, restore at least one inoperable pump to OPERABLE status within 30 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

3. With one emergency service water system loop otherwise inoperable, declare all equipment aligned to the inoperable loop inoperable**, restore the inoperable loop to OPERABLE status with at least one OPERABLE pump within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. (#)

*When handling irradiated fuel in the secondary containment.

**The diesel generators may be aligned to the OPERABLE emergency service water system loop provided confirmatory flow testing has been performed. Those diesel generators not aligned to the OPERABLE emergency service water system loop shall be declared inoperable and the actions of 3.8.1.1 taken.

> INSERT C

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Amendment No. ~~48~~, ~~79~~, 92

INSERT [C] (ESW 3.7.1.2.a.3)

\# During the extended 7-day Allowed Outage Time (AOT) specified by TS LCO 3.7.1.1, Action a.3.a) or a.3.b) to allow for RHRSW subsystem piping repairs, the 72-hour AOT for one inoperable emergency service water system loop may also be extended to 7 days for the same 7-day period.

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

A.C. SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system, and

b. Four separate and independent diesel generators, each with:

   1. A separate day tank containing a minimum of 250 gallons of fuel,

   2. A separate fuel storage system containing a minimum of 33,500 gallons of fuel, and

   3. A separate fuel transfer pump.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

a. With one diesel generator of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 24 hours and at least once per 7 days thereafter. If the diesel generator became inoperable due to any cause other than an inoperable support system, an independently testable component, or preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining operable diesel generators by performing Surveillance Requirement 4.8.1.1.2.a.4 for one diesel generator at a time, within 24 hours, unless the absence of any potential common-mode failure for the remaining diesel generators is determined. Restore the inoperable diesel generator to OPERABLE status within 30 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. See also ACTION e.

b. With two diesel generators of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If either of the diesel generators became inoperable due to any cause other than an inoperable support system, an independently testable component, or preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining diesel generators by performing Surveillance Requirement 4.8.1.1.2.a.4 for one diesel generator at a time, within 8 hours, unless the absence of any potential common-mode failure for the remaining diesel generators is determined. Restore at least one of the inoperable diesel generators to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. See also ACTION e.

*

> INSERT D

INSERT [D] (EDGs 3.8.1.1.b)

* During the extended 7-day Allowed Outage Time (AOT) specified by TS LCO 3.7.1.1, Action a.3.a) or a.3.b) to allow for RHRSW subsystem piping repairs, the 72-hour AOT for two inoperable diesel generators may also be extended to 7 days for the same 7-day period.

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

e. In addition to the ACTIONS above:

1. For two train systems, with one or more diesel generators of the above required A.C. electrical power sources inoperable, verify within 2 hours and at least once per 12 hours thereafter that at least one of the required two train system subsystem, train, components, and devices is OPERABLE and its associated diesel generator is OPERABLE. Otherwise, restore either the inoperable diesel generator or the inoperable system subsystem to an OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. *

2. For the LPCI systems, with two or more diesel generators of the above required A.C. electrical power sources inoperable, verify within 2 hours and at least once per 12 hours thereafter that at least two of the required LPCI system subsystems, trains, components and devices are OPERABLE and its associated diesel generator is OPERABLE. Otherwise, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

This ACTION does not apply for those systems covered in Specifications 3.7.1.1 and 3.7.1.2.

> INSERT E

INSERT [E] (EDGs 3.8.1.1.e.1)

* During the extended 7-day Allowed Outage Time (AOT) specified by TS LCO 3.7.1.1, Action a.3.a) or a.3.b) to allow for RHRSW subsystem piping repairs, the 72-hour AOT may also be extended to 7 days for the same 7-day period.

ATTACHMENT 4

License Amendment Request

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

Proposed Technical Specification Allowed Outage Time Extensions to Support Residual Heat Removal Service Water Maintenance

Summary of Regulatory Commitments

SUMMARY OF REGULATORY COMMITMENTS

The following table provides a comparison of the regulatory commitments identified in the original License Amendment Request (LAR) (Reference 1 to the letter) and those made within this document. Note that several of the original commitments have been eliminated or modified as described below in the table below. (Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.)

Commitment as listed in LAR, Attachment 1, Section 4.2	Current Commitment (Based on Attachment 1 RAI Responses)
1. Adequate staffing will be maintained onsite to facilitate timely response to unexpected conditions during the period of reliance on the extended AOTs.	Deleted. Staffing is ensured as part of the normal work control processes. See RAI Response 8a.
2. Besides the protected opposite RHRSW subsystems and ESW loop required to be operable by TS, elective maintenance, discretionary maintenance and testing on all RHR subsystems and EDGs that provide partial support to the protected RHRSW subsystem will be suspended during the period of reliance on the extended AOTs.	This compensatory measure is now included as a required action in the TS, and therefore, is no longer a regulatory commitment. See RAI Response 1c. Refer to new proposed TS LCO 3.7.1.1, Actions a.3.a)1) or a.3.b)1) in Attachment 3.
2. (continued) Additionally, the following actions will be taken prior to entry into the proposed configuration: a. Proper standby alignment of the opposite RHRSW subsystem will be ensured prior to entry into the AOT to reduce the contribution from potential pre-initiator errors.	This has been redefined as compensatory measure #1 as indicated below and in RAI Response 8d. 1. The following action will be taken prior to entry into the proposed configuration: o Proper standby alignment of the operable RHRSW subsystem will be ensured prior to entry into the AOT to reduce the contribution from potential pre-initiator errors.

Commitment as listed in LAR, Attachment 1, Section 4.2	Current Commitment (Based on Attachment 1 RAI Responses)
2. (continued) b. Availability of the following equipment will be verified: ▪ When RHRSW subsystem A is unavailable: - Diesel Generator 11 - Diesel Generator 21 - Diesel Generator 23 - ESW loop A - Unit 2 LPCI subsystem A - Unit 2 LPCI subsystem C - Unit 2 Core Spray subsystem A ▪ When RHRSW subsystem B is unavailable: - Diesel Generator 12 - Diesel Generator 14 - Diesel Generator 24 - ESW loop B - Unit 1 LPCI subsystem B - Unit 1 LPCI subsystem D - Unit 1 Core Spray subsystem B - Elective maintenance, discretionary maintenance and testing on the above listed equipment will be suspended during the period of reliance on the extended AOTs.	This has been redefined as compensatory measure #2 as indicated below and in RAI Response 8d. It has also been modified in content for consistency with the new proposed TS LCO 3.7.1.1, Actions a.3.a) and a.3.b). 2. Also, the following actions will be taken prior to entry into the proposed configuration: • When the 'A' RHRSW subsystem is inoperable to allow for repairs of the RHRSW A subsystem piping with Limerick Generating Station Unit 2 shutdown, reactor vessel head removed and reactor cavity flooded, the following equipment will be verified as available and protected as defined in procedure OP-AA-108-117: o ESW loop A o Unit 1 LPCI subsystems A and C o D11, D13, and D23 4kV buses and emergency diesel generators o Unit 1 Division 1 and Division 3 Safeguard DC • When the 'A' RHRSW subsystem is inoperable to allow for repairs of the RHRSW A subsystem piping with Limerick Generating Station Unit 1 shutdown, reactor vessel head removed and reactor cavity flooded, the following equipment will be verified as available and protected as defined in procedure OP-AA-108-117: o ESW loop A o Unit 2 LPCI subsystems A and C o D11, D21, and D23 4kV buses and emergency diesel generators o Unit 2 Division 1 and Division 3 Safeguard DC (continued)

Commitment as listed in LAR, Attachment 1, Section 4.2	Current Commitment (Based on Attachment 1 RAI Responses)
	(continued) • When the 'B' RHRSW subsystem is inoperable to allow for repairs of the RHRSW B subsystem piping with Limerick Generating Station Unit 2 shutdown, reactor vessel head removed and reactor cavity flooded, the following equipment will be verified as available and protected as defined in procedure OP-AA-108-117: o ESW loop B o Unit 1 LPCI subsystems B and D o D12, D14, and D24 4kV buses and emergency diesel generators o Unit 1 Division 2 and Division 4 Safeguard DC • When the 'B' RHRSW subsystem is inoperable to allow for repairs of the RHRSW B subsystem piping with Limerick Generating Station Unit 1 shutdown, reactor vessel head removed and reactor cavity flooded, the following equipment will be verified as available and protected as defined in procedure OP-AA-108-117: o ESW loop B o Unit 2 LPCI subsystems B and D o D12, D22, and D24 4kV buses and emergency diesel generators o Unit 2 Division 2 and Division 4 Safeguard DC
3. Activities that adversely affect risk exposure will be prohibited in the LGS 500kV and 220kV electrical switchyards to minimize the possibility of an induced LOOP and loss of power to protected equipment during the period of reliance on the extended AOTs.	This compensatory measure #3 has been redefined as indicated below and in RAI Response 8e. 3. Activities in the switchyard that adversely affect risk exposure are those that have the potential to cause a total loss of offsite power. Therefore, the at-power unit switchyard will be protected in its entirety and equipment in the outage unit switchyard supporting operability of its offsite source will be protected during the RHRSW subsystem piping repairs. This equipment will be protected as defined in procedure OP-AA-108-117 and in accordance with station procedure OP-LG-108-117. This will be controlled via the special procedure developed specifically to govern plant operation while in the extended AOTs.

Commitment as listed in LAR, Attachment 1, Section 4.2	Current Commitment (Based on Attachment 1 RAI Responses)
4. Operational Risk Activities will be restricted during the extended AOTs. Station Vice-President approval will be required to perform emergent operational risk activities during the period of reliance on the extended AOTs.	This compensatory measure has been redefined as indicated below and in RAI Response 8f. 4. Operational Risk Activities (ORAs), as defined in procedure WC-AA-104, involve activities on risk significant systems that have the potential to derate the plant, i.e., cause a loss of planned generation. Typical ORAs involve: an activity that could cause equipment actuations that could cause loss of planned generation; instrument, fuse, or circuit board removal/installation; an activity that will cause a ½ scram or ½ trip; pressurization of common instrument sensing lines; placing of jumpers or lifting energized leads; an activity that could cause vibration or impact near operational risk sensitive equipment, etc. Such activities will be prohibited on the online unit during the RHRSW piping repairs. Exceptions to this must be approved by the senior plant management. This will be controlled as part of the special procedure developed specifically to govern plant operation while in the extended AOTs.
5. The extended weather forecast will be examined to ensure severe weather conditions that would threaten the loss of offsite power are not predicted prior to entry into the AOT. In the event of an unforeseen severe weather condition due to rapidly changing conditions, such as severe high winds, a briefing with crew operators will be performed to reinforce operator actions and responses in the event of a loss of offsite power (E-10/20).	No change to this compensatory measure. This will be controlled via the special procedure developed specifically to govern plant operation while in the extended AOTs.
6. Shift briefs will be performed to reinforce other potentially important operator actions associated with the performance of the extended AOT (i.e., operator actions to refill the condensate storage tank (CST), operator actions to vent containment, operator actions to maximize control rod drive (CRD) injection to the vessel, and operator actions to support continued use of feedwater and condensate post-trip as necessary and if available). Additionally, during the 'A' RHRSW subsystem outage, a shift brief on alternate remote shutdown operations will be performed since some of the normally operated equipment from the remote shutdown panel will not be available.	No change to this compensatory measure. This will be controlled via the special procedure developed specifically to govern plant operation while in the extended AOTs.

Commitment as listed in LAR, Attachment 1, Section 4.2	Current Commitment (Based on Attachment 1 RAI Responses)
7. Shift briefs and pre-job walkdowns to reduce and manage transient combustibles prior to entrance into the extended AOT will be used to alert the staff about the increased sensitivity to fires in the following areas during the extended RHRSW outage windows. Additionally, any hot work activities in the following areas will be prohibited during the time within the extended RHRSW AOT. For the 'A' RHRSW subsystem outage window: <u>Unit 1</u> • Fire Area 15, Unit 1 Division 2 (D12) safeguard 4kV switchgear room • Fire Area 24, Main Control Room • Fire Area 25, Auxiliary Equipment Room <u>Unit 2</u> • Fire Area 17, Unit 2 Division 2 (D22) safeguard 4kV switchgear room • Fire Area 24, Main Control Room • Fire Area 25, Auxiliary Equipment Room For the 'B' RHRSW subsystem outage window: <u>Unit 1</u> • Fire Area 13, Unit 1 Division 1 (D11) safeguard 4kV switchgear room • Fire Area 24, Main Control Room • Fire Area 25, Auxiliary Equipment Room • Fire Area 26, Remote Shutdown Panel <u>Unit 2</u> • Fire Area 19, Unit 2 Division 1 (D21) safeguard 4kV switchgear room • Fire Area 24, Main Control Room • Fire Area 25, Auxiliary Equipment Room • Fire Area 26, Remote Shutdown Panel	This compensatory measure has been redefined as indicated below and in RAI Response 8g. 7. Unattended transient combustibles and hot work will be prohibited in the areas listed below during the extended AOT. This will be controlled via the special procedure developed specifically to govern plant operation while in the extended AOTs. For an 'A' RHRSW subsystem outage window: • Fire Area 15, Unit 1 Division 2 (D12) safeguard 4kV switchgear room • Fire Area 17, Unit 2 Division 2 (D22) safeguard 4kV switchgear room • Fire Area 24, Main Control Room (ECCS B panel 10-C601 (Bay A, B)) • Fire Area 24, Main Control Room (ECCS B panel 20-C601 (Bay A, B)) • Fire Area 25, Auxiliary Equipment Room For an 'B' RHRSW subsystem outage window: • Fire Area 13, Unit 1 Division 1 (D11) safeguard 4kV switchgear room • Fire Area 19, Unit 2 Division 1 (D21) safeguard 4kV switchgear room • Fire Area 24, Main Control Room (ECCS A panel 10-C601 (Bay C, D, E, F)) • Fire Area 24, Main Control Room (ECCS A panel 20-C601 (Bay C, D, E, F)) • Fire Area 25, Auxiliary Equipment Room • Fire Area 26, Remote Shutdown Panel

Commitment as listed in LAR, Attachment 1, Section 4.2	Current Commitment (Based on Attachment 1 RAI Responses)
8a. When the 'A' RHRSW return header is undergoing maintenance, the 'A' and 'B' loop of ESW return flow shall be aligned to the operable 'B' RHRSW return header only. The ESW return valves (i.e., HV-11-015A and HV-11-015B) to the 'B' RHRSW return header will be administratively controlled in the open position and de-energized prior to entering the extended AOT. The ESW return valves, HV-11-011A and HV-11-011B, to the 'A' RHRSW return header will be administratively controlled in the closed position and de-energized as part of the work boundary. (See Item b. in the review of plant impacts described in Section 4.1.)	This compensatory measure is now included as a required action in TS, and therefore, is no longer a regulatory commitment. See RAI Response 1c. Refer to TS LCO 3.7.1.1, Action a.3.a)2) in Attachment 3.
8b. When the 'B' RHRSW return header is undergoing maintenance, the 'A' and 'B' loop of ESW return flow shall be aligned to the operable 'A' RHRSW return header only. The ESW return valves (i.e., HV-11-011A and HV-11-011B) to the 'A' RHRSW return header will be administratively controlled in the open position and de-energized prior to entering the extended AOT. The ESW return valves, HV-11-015A and HV-11-015B, to the 'B' RHRSW return header will be administratively controlled in the closed position and de-energized as part of the work boundary. (See Item b. in the review of plant impacts described in Section 4.1.)	This compensatory measure is now included as a required action in TS, and therefore, is no longer a regulatory commitment. See RAI Response 1c. Refer to TS LCO 3.7.1.1, Action a.3.b)2) in Attachment 3.