NEXTera ENERGY SEABROOK

October 03, 2019
SBK-L-19104
10 CFR 50.90

United States Nuclear Regulatory Commission
Attn.: Document Control Desk
Washington, D.C. 20555-0001

RE: Seabrook Station
Docket No. 50-443

License Amendment Request 19-02, One-Time Change to the Seabrook Technical Specifications Onsite Power Distribution Requirements

Pursuant to 10 CFR 50.90, NextEra Energy Seabrook, LLC (NextEra) is submitting a license amendment request (LAR) for a change to the Seabrook Station (Seabrook) Technical Specifications (TS). The proposed amendment would extend the allowed outage time (AOT) for one A.C. vital panel not energized from its associated inverter from 24 hours to 7 days on a one-time basis.

The Enclosure to this letter provides NextEra's evaluation of the proposed amendment. Attachment 1 to the enclosure provides a mark-up of the existing TS page to show the proposed change. No change is proposed to the current TS Bases as a result of this license amendment request.

Although the proposed license amendment is prompted by neither exigent nor emergency circumstances, NextEra respectfully requests staff review and approval of the proposed license amendment by November 18, 2019 with the change immediately effective for the period that Seabrook is performing the necessary maintenance and retesting of the Vital Inverter 1E. To allow orderly planning and scheduling, NextEra requests authorization to exercise the extended AOT on a one-time basis until 45 days after issuance of the amendment.

In accordance with 10 CFR 50.91, NextEra is notifying the State of New Hampshire of this request by transmitting a copy of this letter and enclosure to the designated State Official.

As discussed in the Enclosure, the proposed change does not involve a significant hazards consideration pursuant to 10 CFR 50.92, and there are no significant environmental impacts associated with the change. The Seabrook Station Onsite Review Group has reviewed the proposed license amendment.

This letter contains no new or revised regulatory commitments.

If you have any questions or require additional information, please contact Ken Browne, Site Director, Nuclear Safety Assurance and Learning, at 603-773-7932.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on October 03, 2019

Eric McCartney
Site Director (VP) – Seabrook Nuclear Power Plant
NextEra Energy

Enclosure: Evaluation of the Proposed Change

cc: NRC Region I Administrator
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EVALUATION OF THE PROPOSED CHANGE

Seabrook Station

License Amendment Request 19-02: One-Time Change to the
Seabrook Technical Specifications Onsite Power Distribution Requirements

1.0 SUMMARY DESCRIPTION

Pursuant to 10 CFR 50.90, NextEra Energy Seabrook, LLC (NextEra) is submitting a license amendment request (LAR) for a change to the Seabrook Station (Seabrook) Technical Specifications (TS). The proposed amendment would extend the allowed outage time (AOT) for one A.C. vital panel not energized from its associated inverter from 24 hours to 7 days on a one-time basis. The proposed change will allow NextEra to perform corrective maintenance and testing on Vital Inverter 1E, which could challenge the current allowed outage time of 24 hours.

2.0 DETAILED DESCRIPTION

2.1 System Design and Operation

120 Volt A.C. Electrical System Description

The 120 VAC vital AC instrument power system is composed of six independent AC buses designated as 1A through 1F, each having its own uninterruptible power supply (UPS). The 120 volt vital AC system is the source of AC power for reactor protection, reactor control and balance of plant instrument systems.

The UPS primary function is to continuously supply power to critical safety-related loads that cannot tolerate momentary power interruptions under normal operating, accident and emergency conditions. The UPS output is regulated within a range to satisfy the power quality for the connected loads to assure proper operation.

120 Volt A.C. Electrical System Design

The vital 120-volt distribution system is the source of uninterruptible power for loads essential to the operation of the plant during normal operations and postulated accident conditions. Major loads consist of the reactor protection and control, solid state protection system (SSPS), and the excore nuclear instrumentation (NI). These systems are divided into four separate channels I, II, III, and IV. The vital balance of plant instruments, and the radiation monitoring system are also divided and powered from redundant supplies. These loads receive 120 VAC ungrounded power from UPS supplied vital main distribution panels I-EDE-PP-1A through -1F, vital distribution sub-panels 1-EDE-PP-11E, -llF, and non-vital distribution sub-panels - 3C and 12E.

The vital instrument distribution system buses supply loads associated with the A train and B train load groups. Since these buses supply mainly safety-related components there is complete physical and electrical separation between trains. To comply with the single failure criteria in IEEE 308-1971 (Reference 6.4), the class 1E power system must provide the protective action required to accomplish a protective function in the presence of any single detectable failure within the Class 1E power system concurrent with all identifiable but non-detectable failures, all failures caused

by the single failure and all failures caused by the design basis event requiring the protective function. Therefore, a fault or failure on one of the buses will not affect the opposite bus. To protect the system from damage due to natural causes, such as earthquakes, the safety-related component mountings and structures are also designed to meet seismic qualifications in accordance with IEEE 344-1975 (Reference 6.5).

The UPS unit consists of a rectifier section which converts three phase 460 VAC power to a nominal 125 VDC power and an inverter section which inverts the DC power to single phase 120 VAC power. The common DC bus which connects the rectifier output, the battery bank, and the input of the inverter, is called the DC link. Blocking circuitry installed in each UPS unit connect the battery source to the internal DC bus and prevents the 125 VDC batteries from supplying the inverter section when ac power is available and is capable of supplying the required output. Should the ac power become unavailable or degrade below the allowable voltage, the diode instantly conducts, linking the internal DC bus to the battery supply providing power to the inverter section. Should a UPS become unavailable, an alternate supply is available by an automatic/manual transfer switch which supplies main panels lE and 1F. On each UPS, instrumentation is provided to monitor AC and DC input currents, as well as, output current and voltage. Alarms are provided on the station computer for loss of AC voltage on the vital instrument bus.

UPSs 1-EDE-I-lE and 1F supply 120 VAC, 60 HZ, power to the vital instrument buses. UPSs 1-EDE-I-lE is "A" train and 1F is "B" train safety- related. Accordingly, the UPS units derive their AC and DC input power from "A" train and "B" train safety related power supplies. These units are normally supplied with 460 V AC from a separate motor control centers on the safety-related buses. Each inverter output feeder is connected through a static transfer switch. Should a UPS become unavailable, a vital instrument bus supply is available by manual or automatic transfer to the 480/120 VAC transformer, fed from a diesel powered bus. This alternate supply is not safety related. In the event the static transfer switch is unavailable, it can be bypassed and the distribution panel supply can be connected to the maintenance power source.

Modes of Operation

The UPSs are energized by using a sequential start-up procedure. Once the unit has been energized and stabilized to steady state conditions, the UPS is available to supply the vital distribution panels. The vital instrument power system has three modes of operation; 1.) normal, 2.) emergency and 3.) maintenance. Circuit breaker lineup, switch position and the supplying source of power are the key factors in determining the operational mode.

Normal Operation

In normal mode, vital inverter units 1-EDE-I-1E and 1F receive power from a diesel backed 460 VAC MCC. The 460 VAC power is converted to approximately 125 VDC by the rectifier section which provides the input to the inverter section. The inverter output is connected to a wave shaping and filtering network prior to connecting to the distribution panels which transforms the quasi-square wave to a nominal 120 VAC 60Hz sine wave for inverters 1-EDE-I-1E and 1F.

Emergency Operation

In the emergency operating mode the rectifier section is inoperable or not capable of being energized from an AC source. Upon loss of the rectifier output or an output reduction below the link voltage, the blocking circuitry connects the vital DC system to the inverter section without interruption to the connecting loads. When connected to the DC supply the loads will continue to receive power from the inverter without interruption or phase shift. The DC system is designed to supply all UPS units during normal operations and postulated accident conditions.

Maintenance Operation

For maintenance purposes each vital distribution panel is provided with a connection to a non-safety 120 VAC supply. When the UPS is required to be isolated for maintenance, the normal main circuit breaker is opened before the maintenance breaker can be closed. The normal supply main disconnect at the vital distribution panels are non-automatic circuit breakers. This circuit breaker line-up provides the distribution panels with a non-safety 120 VAC supply derived from a diesel backed 460 VAC MCC. When switching from the normal supply to the maintenance supply, an interruption will be experienced to the connecting loads.

The UPS distribution configuration can transfer power from vital inverters 1-EDE-I-1E and 1-EDE-I-11F to the maintenance supply either automatically or manually without interruption to the connecting loads. When these UPSs need to be isolated, the maintenance supply circuit breaker to the vital distribution panel is closed and the normal circuit breaker is opened.

2.2 Current Technical Specification Requirements

Technical Specification (TS) 3.8.3.1, "Onsite Power Distribution - Operating" requires in Modes 1 through 4 that 120-volt AC panel 1E be energized from its associated inverter (Inverter 1-E) connected to DC bus 11A. TS 3.8.3.1 action b. stipulates:

"With one A.C. vital panel either not energized from its associated inverter, or with the inverter not connected to its associated D.C. bus: (1) reenergize the A.C. vital panel within 2 hours or be in at least HOT STANDBY within the next 6 hours and

in COLD SHUTDOWN within the following 30 hours; and (2) reenergize the A.C. vital panel from its associated inverter connected to its associated D.C. bus within 24 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours."

2.3 **Reason for the Proposed Change**

On September 8, 2019, the Seabrook Station control room received multiple alarms relating to the 1E vital inverter, EDE-I-1-E. Field reports indicated that the inverter had switched to its DC power supply. Technical Specification 3.8.3.1 requires Power Panel EDE-PP-1-E to be powered from EDE-I-1-E, which must be connected to a DC power source. Currently, inverter EDE-I-1-E is supplying Power Panel EDE-PP-1-E from its DC power source, EDE-SWG-11-A, which is being supported by its battery charger via normal line-up. Power panel EDE-PP-1-E is currently Operable as a result of being powered by the DC power source.

The most probable cause of 1E vital inverter switching to its DC power supply is the failure of the inverter gate-firing card. To repair the card, the vital inverter is required to be fully down powered and tagged out of service. While removed from service, the EDE-PP-1-E power panel will be powered from its maintenance power supply. While the EDE-PP-1-E power panel functions would not be affected, the station would be subject to the 24-hour allowable outage time (AOT) of TS 3.8.3.1, ACTION b, due to vital inverter, EDE-I-1-E being removed from service. The estimated time it will take to replace the gate-firing card of vital inverter, EDE-I-1-E is 8 to 12 hours, in addition to post-maintenance testing. If the replacement of the gate-firing card does not fully restore the function of the vital inverter, there are potential equipment conditions that may indicate additional maintenance is necessary. There is also the risk with discovering additional warranted repairs or failures occurring while restoring the inverter prior to exiting the 24 hour AOT. To avoid potentially entering the time frame to submit a Notice of Enforcement Discretion (NOED) to the Staff, NextEra is requesting approval of this one-time extension to the AOT in order to provide additional time for repair of the Vital Inverter 1E. The request from 24 hours to 7 days allows for the execution of maintenance and retest activities without the burden of unnecessary time pressure to preclude Unit shutdown.

2.4 **Description of the Proposed Change**

The proposed license amendment would revise ACTION b of TS LCO 3.8.3.1, by adding a new asterisk (*) to ACTION b(2) and a new footnote denoted by the asterisk (*) as follows:

ACTION

b. With one A.C. vital panel either not energized from its associated inverter, or with the inverter not connected to its associated D.C. bus: (1) reenergize the A.C. vital panel within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours; and (2) reenergize the A.C. vital panel from its associated inverter connected to its associated D.C. bus within 24 hours* or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

**** A one-time AOT extension for an inoperable 120-volt A.C. Vital Panel #1E allows 7 days to restore the associated inverter to OPERABLE status. Compensatory measures within NEE Letter SBK-L-19104 dated October 03, 2019 will remain in effect during the extended AOT period. The one-time AOT extension shall expire 45 days after the issuance of the amendment.***

3.0 TECHNICAL EVALUATION

The proposed license amendment would permit a one-time change to TS 3.8.3.1, ACTION b, to provide 7 days to restore the 1E A.C. vital panel from its associated inverter connected to its associated D.C. bus. The proposed change would enable Seabrook to repair malfunctioning equipment and thus avoid the possibility of an unnecessary plant transient or the need to request regulatory relief in the form of a Notice of Enforcement Discretion (NOED) or an emergent technical specifications amendment.

In proposing a one-time AOT extension to TS 3.8.3.1, ACTION b, NextEra applied Regulatory Guide (RG) 1.177, "An Approach for Plant-Specific, Risk-Informed Decision-making: Technical Specifications" (Reference 6.8). RG 1.177 describes acceptable methods for assessing the nature and impact of proposed TS changes, including one-time AOT extensions, by considering engineering issues and applying risk insights. Each of the RG 1.177 principles are addressed below:

During the proposed one-time AOT extension, power to vital panel EDE-PP-1E will be maintained by the 120 VAC, diesel backed maintenance supply, and as discussed in Section 3.3 of this amendment request, the consequences of a vital panel EDE-PP-1E failure during the AOT extension is sufficiently low. The table provided within Attachment 2 summarizes the potential effects to the station upon a loss of power to vital panel EDE-PP-1E. As can be seen, no specific contingency actions are required for each of the vital panel EDE-PP-1E specified functions. As such, a loss of the vital panel during the proposed AOT extension will not adversely affect safety.

In the event of a Loss of Offsite Power, the emergency buses and the EDE-PP-1-E maintenance supply will be energized after approximately 12 seconds. Attachment 2 provides a listing of the instrument bus circuits. Non-safety related instrument bus ED-PP-12E, which is supplied from EDE-I-1-E, was not included in this attachment. The tables for EDE-PP-1E and EDE-PP-11E apply to these panels while they are energized from their maintenance source (EDE-I-1E out-of-service) and the redundant train inverter, EDE-I-1F, is in service.

Indication and alarm circuits are not individually listed where the indication and alarm circuits are restored to pre-LOOP conditions with no required contingency operator actions. The evaluation assumed that the operators would not take incorrect actions based on the disabled indications within the 12 seconds that it takes the EDG to restore power.

3.1 Regulatory Compliance

No exceptions or exemptions from applicable codes and standards relevant to safe plant operation are proposed by this amendment request. Power to vital panel EDE-PP-1-E will be maintained by the 120 VAC, diesel backed maintenance supply for the duration of the proposed AOT extension. As such, the capability of vital panel EDE-PP-1-E to perform all required functions consistent with applicable requirements and safety analysis assumption will be maintained during the proposed one-time AOT extension.

3.2 Defense in Depth

During the proposed one-time AOT extension, defense-in-depth measures will be applied to account for unknown and unforeseen failure mechanisms or other phenomena and thereby ensure safety function is maintained. Appropriate Compensatory Actions (shown below) have been established to the extent practical and will be implemented at the earliest appropriate time in order to maintain defense in depth. By creating these multiple independent and redundant layers of defense, compliance with applicable general design criteria, national standards and engineering principles which assure the integrity of barriers to core damage will be maintained.

Compensatory Actions

During the proposed AOT extension, the following compensatory measures will be in effect:

(1) No testing or maintenance activities will be performed during the extended AOT that could potentially cause a plant transient.

(2) No testing or surveillances will be performed on the vital inverters during the extended AOT.

(3) Operations will guard the following equipment in accordance with NextEra procedure OP-AA-102-1003, Guarded Equipment:

i. MCC-531 (I-1E maintenance supply)
ii. EDE-BC-1A,

iii. DC-Bus 11A.

(4) Operations will monitor the weather for adverse conditions and factor the weather conditions into work planning for corrective maintenance on the 1E inverter prior to starting work.

(5) Operations will ensure grid conditions are stable and the extended AOT interval will not be entered during a Master/Local Control Center Procedure No. 2 (M/LCC 2) – Abnormal Conditions Alert situation.

(6) Just-in-time training will be performed on procedure OS1247.02, Loss of 120 V AC Vital Instrument Bus PP1E or PP1F, Revision 16.

3.2.2. Human Performance

Prior to the start and during each shift of the proposed AOT extension, a pre-job briefing will be conducted to reinforce expected human performance behaviors and bolster defense-in-depth barriers to human errors. In order to minimize plant challenges, Operators and maintenance crews will be briefed on procedures for implementing and maintaining the equipment lineup necessary to perform the planned Vital Inverter 1E maintenance. Risk aspects of the proposed AOT extension will be emphasized during these briefings. Operators will be additionally briefed on responding to unintended and unforeseen circumstances that may rely on Onsite Power Distribution system operability during the proposed AOT extension.

3.2.3. Safety Margin

The proposed one-time amendment does not alter the design and operation of EDE-I-1-E, will not result in plant operation in a configuration outside the design basis, and will not impact any assumptions or consequences specified in applicable safety analyses. Safety margins will be maintained in accordance with Seabrook safety analyses acceptance criteria and no changes are proposed that affect any assumptions or inputs to applicable safety analyses. Sufficient equipment redundancy will exist due to the availability of EDE-I-1-F and the EDE-I-1-E maintenance supply during the proposed AOT extension to ensure power is available to safety-related loads supplied from these inverters. As such, no safety margins are impacted by the proposed change.

3.2.4. Other Defense-in-Depth Considerations

A reasonable balance among prevention of core damage, and consequence mitigation will be preserved during the proposed Completion Time extension. The power panel 1E will be powered via its non-vital maintenance supply during the proposed AOT extension . No other SSCs will be affected by the proposed AOT extension and no limits will be imposed on any SSC performing its specified function. Elevated risk awareness and the protection of critical equipment will be executed (as shown in Compensatory Actions above) during the proposed AOT extension in accordance

with existing plant procedures. However, these programmatic activities will be accompanied by pre-job and periodic (e.g. shift change) briefings, equipment walk downs, progress updates, and increased operational and managerial scrutiny. As such, there will be no over-reliance on programmatic activities as compensatory measures during the proposed AOT extension. The independence of the physical barriers to radiological releases will not be degraded as a result of the proposed AOT extension. The planned Vital Inverter 1E maintenance will not impact fuel cladding, Reactor Coolant System (RCS) or Containment integrity. No other systems, structures and components (SSC) will be affected by the proposed AOT extension and thereby no limits will be imposed on any SSC in performing its specified safety function.

Potentially risk significant plant configurations will not occur during the proposed one-time AOT extension due to online risk assessment tools and increased operational and managerial scrutiny of plant operations. During the planned maintenance of Vital Inverter 1E, no risk significant plant equipment will be removed from service and protective measures will be implemented to reduce the likelihood of challenges to risk significant equipment. As a result, the functional redundancy, independence and diversity currently described in the Seabrook Station Updated Final Safety Analysis Report (USFAR) will be maintained throughout the proposed Completion Time extension.

Defenses against potential common-cause failures (CCFs) will be maintained by limiting non-essential maintenance and operation of SSCs having mitigatory roles credited in accident analyses.

3.3 <u>Evaluation of Risk Impact</u>

Purpose

This evaluation considers the increased risk resulting from an extension of the AOT for instrument bus inverter, 1-EDE-I-1-E, from 24 hours to 7 days. Failure of the inverter does not create an initiating event or increase the frequency of an initiating event. The current 24 hour AOT is overly restrictive and, since exceeding the AOT requires a plant shutdown, has a negative impact on overall plant risk.

Evaluation

The inverter is not included in the PRA model. The inverter was not modeled because upon inverter failure, there is an automatic transfer to a maintenance power supply. This maintenance supply is diesel backed, so inverter failure only represents a marginal loss of redundant supply (i.e. DC power input) to the associated loads, but does not fail any equipment. In addition, failure of this inverter does not create an initiating event and does not affect containment function or increase the likelihood of a containment bypass event. This inverter does not supply power to the reactor protection system (RPS). Seabrook Station operating experience demonstrates that

failure of this inverter does not result in a plant transient. The maintenance supply (1-EDE-MCC-531) for the subject inverter is included in the PRA model.

For this evaluation, inverter EDE-I-1E and other functions supporting the 1E bus were added to the PRA model. The new logic for the 1E bus included failure of the 480V Bus E53, failure of components supporting 460V MCC E531, failure of the 125VDC switchgear, inverter common cause failure, failure of inverter EDE-I-1E and its bus. Similar logic was added for inverter EDE-I-1F.

Procedure OS1247.02, Loss of 120 V AC Vital Instrument Bus PP-1E or PP-1F, Revision 16, was reviewed to determine what potentially risk significant functions would be impacted by the loss of bus PP1E. The following table lists the risk significant functions affected by the unavailability of EDE-I-1E along with associated model changes. Though procedure OS1247.02 provides guidance for operators to prevent all or most of the impacts listed, operator actions are not credited, with one exception, in order to provide a conservative assessment of potential impacts.

Procedure OS1247.02 **Conditions resulting from Loss of power panel EDE-PP-1E considered in the PRA**	
Conditions Considered in the PRA	**PRA Model Changes**
Both containment Primary Component Cooling Water (PCCW) loops are isolated (on restoration of power) AND loss of PCCW temperature control, causing PCCW flow control to fail to full cooling mode. Although unlikely, overcooling could lead to stresses that may fail the thermal barrier heat exchanger, which then leads to a small LOCA and potential failure of the ECCS pump oil coolers.	Modeled as a loss of thermal barrier cooling and potential loss of coolant due to thermal barrier rupture, applying a conservative value for heat exchanger failure probability and a failure of manual actions to control PCCW temperature. Engineering studies and plant operating experience indicate that pressure boundary failure is unlikely. No ISLOCA concern since the rupture would be into the TBC system, which is self-contained within containment.
Charging System CS-HCV-182, fails open and causes a flow diversion that results in the loss of seal injection flow control.	Developed an initiating event for loss of power from the inverter and maintenance supply and linked it to the loss of RCP seal injection initiating event. Operators can take manual control of charging, but no operator action was credited.

The EDG jacket coolant temperature control valve (1-DG-TCV-7A-1) and Air Cooler Coolant Temperature Control Valve (1-DG-TCV-7A-2) fail to the full cooling position. Controllers' capability to modulate jacket coolant and air cooler coolant temperature is lost. If jacket coolant temperature is less than 92°F the DG is inoperable per procedure **OS1026.03.** Procedures direct the operators to manually control temperature.	Logic was added to fail the associated diesel in the event that there is no power from EDE-PP-1E or EDE-PP-1F. For a cold diesel start, the failure could overcool the diesel. The time for recovery prior to overcooling would be roughly 10 minutes. It would take an operator about 10 minutes to manually control temperature if the operator was in the vicinity at the time the alarm came in. Therefore, no operator action was credited for manual control of jacket coolant temperature.
Loss of Train A MSIV control capability. For this event, assumed an impact on ADVs. Although ADV impact is not specified in the procedure and the loss of MSIV control capability does not result in any specific actions in the procedure, modeling of the ADV failure would be considered conservative.	Failure of ADVs (fails to open) due to loss of bus 1E/1F was incorporated into the PRA model. Loss of EDE-PP-1E results in loss of local and auto control of Loops 1 and 3 ADVs. Loss of EDE-PP-1F results in loss of local and auto control of Loops 2 and 4 ADVs. No operator actions are credited for manual control.
Capability to trip the ED-I-2A dc supply breaker within 15 minutes when ED-I-2A is drawing current from EDE-SWG-11C is lost (from OS1247.02, Att. A, p. 1).	Added failure of bus 1E under Gate for OPERATOR fails to shed DC loads to extend battery lifetime to 12 hrs.

The risk impacts using the modified PRA model assuming inverter EDE-I-1E is unavailable for 7 days are provided in the tables below.

ICCDP	
Base Case - with modified Fault tree	8.57E-06
Unavailability of EDE-I-1E set to 1.0	8.65E-06
ΔCDF	7.85E-08
ICCDP for 7 days	**1.51E-09**

ICLERP	
Base Case - with modified Fault tree	1.54E-07
Unavailability of EDE-I-1E set to 1.0	1.59E-07
ΔLERF	5.06E-09
ICLERP for 7 days	**9.73E-11**

These results demonstrate that plant risk associated with implementation of the one-time only TS CT change is acceptable based on the following RG 1.177, Rev. 1 criteria, ICCDP of less than 1.0×10^{-6} and an ICLERP of less than 1.0×10^{-7}. In addition, uncertainties are bounded by these results given that many of the assumptions are demonstrably conservative.

Safety Significance

Extending the AOT for instrument bus inverter 1-EDE-I-1E from 24 hours to 7 days results in a very small increase in plant risk of core damage and large early release. Failure of this inverter does not adversely affect any mitigating equipment or create an initiating event.

Conclusion

This PRA evaluation supports an AOT extension for inverter 1-EDE-I-1E from 24 hours to 7 days.

Sources of Model Uncertainty:

The Seabrook Station evaluation of sources of model uncertainty and related assumptions was revised for the PRA model of internal events and internal flooding events. The revision used guidance contained in NUREG-1855, Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decision Making and EPRI TR-1016737, Treatment of Parameter and Model Uncertainty for Probabilistic Risk Assessment to identify potential sources of generic and plant-specific uncertainty that should be reviewed/considered for possible impact on risk-informed applications. Based on a review of the identified generic and plant-specific sources of uncertainty, there are no sources of uncertainty that have a significant impact on the risk model and thus there is no significant impact on the results of this evaluation.

Seabrook PRA Peer Review History

The ASME / ANS PRA Standard (ASME/ANS RA-Sa-2009) has eight "parts" with technical elements, high-level requirements (HLRs), and detailed supporting requirements (SRs). These parts represent the major classes of hazards included in a PRA:

- Part 1, introductory w/ configuration control
- Part 2, internal events
- Part 3, internal flood
- Part 4, internal fire
- Part 5, seismic events
- Parts 6 to 9, other external hazard events (Screened)

NRC Regulatory Guide 1.200 Rev 2 endorses this Standard with minor "clarifications." The EPRI ePSA database includes each supporting requirement from ASME/ANS RA-Sa-2009 along with the clarifications from NRC Regulatory Guide 1.200 Rev 2.

The Seabrook PRA has undergone peer review against ASME PRA Standard Parts 1 (configuration control), 2 (internal events) and 3 (internal flood events). Note that the Seabrook PRA currently includes a comprehensive assessment of internal fire, seismic, and other external events. However these aspects of the PRA model and associated documentation have not undergone a formal peer review against the ASME PRA Standard or Reg. Guide 1.200.

Peer reviews have been conducted against internal event supporting requirements as follows:

- In 1999, a review of all technical elements was performed using the industry PSA Certification process, the precursor to the PRA Standard.
- In 2005, a focused peer review was performed for the elements AS, SC and HR as well as configuration control. This review was done to PRA Standard ASME RA-Sa-2003.
- In 2009, a focused peer review was performed for all elements of Part 3, Internal Flooding. This review was done to PRA Standard ASME/ANS RA-Sa-2009.
- In 2012, a focused peer review was performed for the element LE. This review was done to PRA Standard ASME/ANS RA-Sa-2009.

Four self-assessments against the internal event SRs in the PRA standard were performed in 2005 (ASME RA-Sa-2003), 2007 (ASME RA-Sb-2005), 2010 (ASME/ANS RA-Sa-2009) and 2011 (ASME/ANS RA-Sa-2009). The first three self-assessments considered all internal events technical elements. The SA-2011 addressed only the open findings against specific SRs.

The 2011 Self-Assessment represents the most current status of Seabrook PRA capability, except for element LE. It updated the 2010 Self-Assessment, based on open items closed out in the 2011 PRA Update. The 2010 Self-Assessment had assessed the 2009 PRA against each of the 254 internal events supporting requirements in ASME/ANS RA-Sa-2009. That assessment reviewed the results of previous peer reviews and their observations along with the subsequent revisions to the PRA that addressed the observations.

In October 2017, all resolved findings were reviewed to Appendix X to NEI 05-04, NEI 07-12 and NEI 12-13, "Close-out of Facts and Observations" (F&Os) as accepted by NRC in the staff memorandum dated May 3, 2017 (ML17079A427).

The table below provides a summary of the open findings subsequent to the independent review. None of the open findings have an impact on the results and conclusions of this LAR.

Disposition and Resolution of Open Peer Review Findings and Self-Assessment Open Items				
Finding No.	**Supporting Requirement**	**Capability Category (CC)**	**Description**	**Disposition**
F&O HR-E3-1	HR-E3	Not Met	While simulator exercises were observed, there is no evidence of specific talk-throughs with Operations/Training. Interaction with Operations and/or Training is important regarding the assumptions used in the HRA, especially response times and performance shaping factors (PSFs), to confirm that the interpretation and implementation of the procedures are consistent with plant training and expected responses.	The action taken to address the original finding included a comprehensive review of all post-initiator dynamic operator actions associated with scenarios initiated at-power by a former Seabrook Station operations shift manager and training instructor. Each action was reviewed as documented in the HRA Calculator and revisions were incorporated based on his research and knowledge and, where needed, the support of current operations and training personnel. The independent review identified that the action taken to address this finding does not fully meet the intent of the SR. Consequently, there is a need to conduct and document a talk-through, with plant operations and training personnel, of the procedures and sequences of events to confirm that interpretation of the procedures is consistent with plant operations and training procedures. Given the previous comprehensive review of all HEPs by a highly qualified operations individual, conducting further talk-throughs with additional operations/training personnel and documenting those talk-throughs is not expected to have an impact on the HEP models nor the overall PRA model results and insights. <u>Conclusion:</u> A documentation change is needed to close this finding.
F&O 4-7	IFQU-B1	Not Met	Self-Assessment points out areas of improvement in reviewing results and identifying significant contributors to CDF (and LERF), such as initiating events, accident sequences, and basic events (equipment unavailability and human failure events), shall be identified. In addition, the results shall be traceable to the inputs and assumptions made in the PRA. Possible Resolution: Provide more details on the modeling inputs and assumptions as they relate to the results.	This item is related to internal flooding. The action taken to address the original finding included an IF sequence review and results review performed in an integrated fashion with all Level 1 results. IF dominating sequences were identified and described in the IF documentation, which also provided flood-specific results for flooding initiating events, flood basic events (doors) and human failure events contributions to CDF. The current documentation provides a comprehensive summary of the flood group sequences along with quantitative and qualitative insights for flood. The documentation improvement needed to close this finding involves adding a short discussion about the flood initiator relative importance and any specific assumptions. Also, include a statement on the benefit gained by the installation of the fire protection flow orifice, which significantly reduced flood risk. <u>Conclusion:</u> A documentation change is needed to close this finding.
F&O 5-12	IFSO-A1 IFSN-A8	CC-III / CC-II	No review appears available relative to backflow through drains. Another plant recently had an NRC identified issue where a radwaste pipe tunnel floor drain emptied into an RHR Room Sump. This represented an identified pathway from one building to another. Consider a more detailed review of floor drain connections and interfaces. The self-assessment also questioned floor capacity for cases with significant water accumulation (i.e., rugged doors prevent propagation to other areas). More explicit review of the potential for floor drain backflow, including	The action taken to address the original finding included an additional review of the floor drain systems in the major flooding areas of interest including postulating possible floor drain backup, waste tank backup and qualitative assessment of check valve failure in sump pump discharge systems. There are no valves (AOVs/MOVs/check) in the floor drain system itself. No vulnerabilities were identified based on the review. In particular, check valves exist in the RHR sump pump discharge lines to prevent backflow from one RHR vault to the other. It is also noted that the potential for floor drain propagation including postulated backflow is specifically included in the IF analysis, particularly for CSR and electrical tunnel interactions. The documentation improvement needed to close this finding includes adding a discussion of the sumps overflowing and adding further discussion on the potential for drain backflow, both of which have been addressed in the development of the IF model. <u>Conclusion:</u> A documentation change is needed to close this finding.

Disposition and Resolution of Open Peer Review Findings and Self-Assessment Open Items				
Finding No.	**Supporting Requirement**	**Capability Category (CC)**	**Description**	**Disposition**
			the potential for check valve failure, may yield some noteworthy insights. For example, there is currently no discussion of the potential for backflow from the RHR A sump to the RHR B sump.	
F&O LE-D6-01	LE-D6	Not Met	The analysis does not consider an increased probability of thermally-induced steam generator tube rupture due to depressurized steam generators that may occur due to secondary side conditions as mentioned in item (b) of the SR. In addition, because thermally-induced tube rupture follows hot leg integrity in the event tree, proper consideration of the conditional probabilities should be re-addressed to ensure that it is not receiving a lower probability than it should. As the plant ages, the analysis should also be cognizant that at some point the tubes should no longer be considered 'pristine.'	The action taken to address the original finding included a review of EPRI TR-107623 Rev. 1 and NUREG-1570. Section 8 of the TR was reviewed for applicability and to ensure that the top event modeling of SGTI (pressure-induced failure before core damage) and XSGTI (temperature-induced SG tube failure after core damage) is reasonably consistent with the EPRI report relative to LERF. It is noted that the EPRI Report provides a detailed method to support a risk-inform application of an alternate repair criteria and/or operate with degraded tubing. This risk methodology goes beyond the existing resolution of the Seabrook PRA for modeling of SGTI and XSGTI. However, the existing modeling of SGTI and XSGTI is judged to be robust and adequate to account for all LERF contributors driven by tube failure during severe accident conditions. As a result of the above review and based on judgment, the baseline severe accident SG tube rupture probability for temperature-induced (XSGTI) was to be increased from 0.001 to 0.1. However, this change needs to be implemented in the model to close this finding. Based on a sensitivity case, an increase in the XSGTI1 probability from 1e-3 to 0.1 will increase release category LE13A (thermally-induced SGTR subsequent to core damage from 1.7E-012/yr to 2.3E-10/yr. Although the LE13A bin has increased by almost 2 orders of magnitude, it is still very small and contributes only approximately 0.15% to the total LERF. <u>Conclusion:</u> A change to split fraction XSGTI1 (1E-03 to 0.1) is needed to completely close this finding. However, the sensitivity case indicates that this change will increase the overall LERF by less than 1%, which is negligible. This finding has negligible impact on this risk-informed application.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

10 CFR 50.36 Technical Specifications

10 CFR 50.36, "Technical Specifications," states: that Limiting Conditions for Operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met. The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and is based on meeting the design basis of the unit. The inverters are a part of the distribution system and, as such, satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

General Design Criterion (GDC) 17

General Design Criterion (GDC) 17, "Electric power systems," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50 requires, in part, that nuclear power plants have onsite and offsite electric power systems to permit the functioning of SSCs that are important to safety. The onsite power system is required to have sufficient independence, redundancy, and testability to perform its safety function, assuming a single failure. The proposed change continues to provide sufficient independence, redundancy, and testability and therefore continues to meet GDC-17.

General Design Criterion (GDC) 18

GDC-18, "Inspection and testing of electric power systems," requires that electric power systems that are important to safety must be designed to permit appropriate periodic inspection and testing. The proposed change does not make changes to inverter inspections or testing and therefore continues to meet GDC-18.

10 CFR 50.65

10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," requires that preventive maintenance activities must be sufficient to provide reasonable assurance that SSCs are capable of fulfilling their intended functions. As it relates to the proposed inverter AOT extension, 10 CFR 50.65(a)(4) requires the assessment and management of the increase in risk that may result from proposed maintenance activities. As discussed previously, the Seabrook Maintenance Rule program monitors the reliability of the A.C. inverters and ensures that appropriate management attention and goal setting are applied based on pre-

established performance criteria. The vital inverter 1E is currently in the 10 CFR 50.65(a)(2) Maintenance Rule category (i.e., vital inverter 1-E is meeting established performance criteria). The Seabrook MR program is consistent with 10 CFR 50.65(a)(4), and is managed to ensure that risk-significant plant configurations will not be entered for planned maintenance activities, and that appropriate actions will be taken should unforeseen events place the plant in a risk significant configuration during the proposed extended vital inverter 1-E AOT. Therefore, the proposed extension of the vital inverter 1-E AOT from 24 hours to 7 days are not anticipated to result in exceeding the current established Maintenance Rule criteria for the inverter.

Regulatory Guide 1.177

Regulatory Guide (RG) 1.177 describes methods acceptable to the NRC staff for assessing the nature and impact of proposed TS changes by considering engineering issues and applying risk insights.

Regulatory Guide 1.200

Regulatory Guide 1.200 describes one acceptable approach for determining whether the technical adequacy of the PRA, in total or the parts that are used to support an application, is sufficient to provide confidence in the results, such that the PRA can be used in regulatory decision-making for light-water reactors.

4.2 Precedent

The proposed license amendment modifies the Seabrook TS by extending the AOT for one A.C. vital panel not energized from its associated inverter from 24 hours to 7 days on a one-time basis. The NRC has approved similar requests for an AOT extension, as indicated below:

4.2.1. In Reference 6.9, the NRC issued to Salem Nuclear Generating Station, Units 1 and 2, License Amendments Nos. 306 and 307, extending the AOT for the vital instrument bus inverters, from 24 hours for the A, B, and C inverters to 7 days, and from 72 hours for the D inverter to 7 days, to provide increased flexibility in the scheduling and performance of corrective maintenance.

4.2.2. In Reference 6.10, the NRC issued to Palo Verde Nuclear Generating Station, License Amendment No. 180, extending the AOT for an inoperable vital alternating current inverter from 24 hours to 7 days, to support the ability to complete online corrective maintenance of these components.

4.3 **No Significant Hazards Consideration Determination Analysis**

The proposed license amendment would extend the allowed outage time (AOT) for one A.C. vital panel not energized from its associated inverter from 24 hours to 7 days on a one-time basis. The proposed change will allow NextEra to perform corrective maintenance and testing on Vital Inverter 1E, which could challenge the current allowed outage time of 24 hours. In accordance with 10 CFR 50.92, NextEra has concluded that the proposed changes do not involve a significant hazards consideration. The basis for the conclusion that the proposed changes do not involve a significant hazards consideration is as follows:

(1) The proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed change extends the AOT for the vital inverter 1-E from 24 hours to 7 days. Vital inverter 1-E does not solely support any risk-significant functions. The failure of an inverter is not an initiator of any analyzed event and does not increase the frequency of an initiating event. Consequently, extending the AOT will not have an impact on the frequency of occurrence of any event previously analyzed. The proposed change does not alter the design, configuration, operation, or function of any plant system, structure, or component. As a result, the outcomes of previously evaluated accidents are unaffected.

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

(2) The proposed changes do not create the possibility of a new or different kind of accident from any previously evaluated.

No new accident scenarios, failure mechanisms, or limiting single failures are introduced as a result of the proposed change. The proposed change does not challenge the performance or integrity of any safety-related system. The proposed change neither installs nor removes any plant equipment, nor alters the design, physical configuration, or mode of operation of any plant structure, system, or component. Installed equipment will not be operated in a new or different manner. No physical changes are being made to the plant, so no new accident causal mechanisms are being introduced. Procedures that ensure the unit operates within analyzed limits and procedures that respond to off-normal and emergency conditions are not altered with this proposed change.

Therefore, the proposed change does not create the possibility of a new or different accident from any previously evaluated.

(3) The proposed changes do not involve a significant reduction in the margin of safety.

The margin of safety associated with the acceptance criteria of any accident is unchanged. The proposed change does not alter the design, configuration, operation, or function of any plant system, structure, or component. The ability of any operable structure, system, or component to perform its designated safety function is unaffected by this change. Operation with one instrument bus inverter inoperable and the associated instrument bus aligned to its maintenance supply does not result in a significant reduction in the margin of safety. Surveillance testing of the emergency diesel generators (EDGs) and the electrical distribution system provides confidence that the EDGs will energize the emergency AC buses following a loss of power.

Therefore, the proposed change does not involve a significant reduction in the margin of safety.

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

4.4 Conclusions

In conclusion, NextEra has concluded that reasonable assurance exists that the proposed change (1) will not endanger the health and safety of the public, and (2) is in compliance with NRC regulations.

5.0 ENVIRONMENTAL CONSIDERATION

NextEra has evaluated the proposed amendment for environmental considerations. The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the proposed amendment.

6.0 REFERENCES

6.1 10 CFR 50, Appendix A - General Design Criteria for Nuclear Power Plants

6.2 Seabrook Updated Final Safety Analysis Report, Section 8.3.1.1.d - 120V Vital Instrumentation and Control Power System

6.3 Seabrook DBD-ED-04, Rev 05 – Design Basis Document – 120 VAC Vital and Non-Vital Instrument Power Systems

6.4 IEEE 308-1971, “Criteria for Class 1E Power Systems for Nuclear Power Generating Stations”

6.5 IEEE 344-1975, "Guide for Seismic Qualification of Class 1E Electric Equipment for Nuclear Power Generating Stations"

6.6 51 Federal Register 7744, 7756 (March 6, 1986)

6.7 NRC Inspection Manual Chapter 0410 – Notices of Enforcement Discretion, March 13, 2013 (ADAMS Accession No. ML ML13072A127)

6.8 RG 1.177 – An Approach for Plant-Specific, Risk-Informed Decision Making: Technical Specifications, May 2011 (ADAMS Accession No. ML 100910008)

6.9 Salem Nuclear Generating Station, Unit Nos. 1 and 2 – Issuance of Amendment Nos. 326 and 307 Re: Revise Technical Specifications to Increase Vital Instrument Bus Inverter Allowed Outage Time (EPID L-2018-LLA-0140), January 25, 2019 (ADAMS Accession No ML19009A477).

6.10 Palo Verde Nuclear Generating Station, Units 1, 2, and 3, Issuance of Amendments Re: Changes to Technical Specification 3.8.7, "Inverters - Operating" (TAC NOS. ME2337, ME2338, AND ME2339), September 29, 2010 (ADAMS Accession No. ML102670352)

ATTACHMENT 1

PROPOSED TECHNICAL SPECIFICATION PAGE (MARKUP)

(1 page follows)

LIMITING CONDITION FOR OPERATION

3.8.3.1 (Continued)

i. Train A, 125-volt D.C. Busses consisting of:

1) 125-volt D.C. Bus #11A energized from Battery Bank 1A or 1C, and
2) 125-volt D.C. Bus #11C energized from Battery Bank 1C or 1A.

j. Train B, 125-volt D.C. Busses consisting of:

1) 125-volt D.C. Bus #11B energized from Battery Bank 1B or 1D, and
2) 125-volt D.C. Bus #11D energized from Battery Bank 1D or 1B.

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

ACTION:

a. With one of the required trains of A.C. emergency busses (except 480-volt Emergency Bus # E64) not fully energized, reenergize the train within 8 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

   1. With 480-volt Emergency bus #E64 not fully engergized, reenergize the bus within 7 days or be in HOT STANDBY within 6 hours and COLD SHUTDOWN within the following 30 hours.

b. With one A.C. vital panel either not energized from its associated inverter, or with the inverter not connected to its associated D.C. bus: (1) reenergize the A.C. vital panel within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours; and (2) reenergize the A.C. vital panel from its associated inverter connected to its associated D.C. bus within 24* hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Add new asterisk (*)

c. With one D.C. bus not energized from an OPERABLE battery bank, reenergize the D.C. bus from an OPERABLE battery bank within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Add new footnote
See below

* A one-time AOT extension for an inoperable 120-volt A.C. Vital Panel #1E allows 7 days to restore the inverter to OPERABLE status. Compensatory measures within NEE Letter SBK-L-19104 dated October 3, 2019 will remain in effect during the extended AOT period. The one-time AOT extension shall expire 45 days after issuance of amendment.

ATTACHMENT 2

Effects of Loss of Power to AC Instrument Buses

(2 pages follow)

EDE-PP-1E - Loss of Power Effect
1. Lose the capability for the Train A level instruments on the Train A & the Train B primary component cooling water (PCCW) head tanks to initiate a low-low level signal to isolate the respective PCCW loops to containment. (circuit 1; MM-CP-152A)
2. Lose the capability to automatically isolate PCCW Loop A to the waste process building on a Loop A PCCW head tank low level signal. (circuit 1; MM-CP-152A)
3. Lose the capability to automatically isolate PCCW Loop A radiation monitor on a PCCW Loop A head tank low level signal. (circuit 1; MM-CP-152A)
4. Lose capability to automatically actuate the Train A service water cooling tower. (circuits 1; MM-CP-152A, &10)
5. Lose automatic and manual temperature control for PCCW Loop A and the control valves go to the full cooling position. (circuits 2; MM-CP-108A, & 19; MM-CP-297A)
6. Lose capability to modulate (auto position control) Loops 1 & 3 atmospheric steam dump valves (ASDV) from the local control panel. (circuit 2; MM-CP-108A)
7. Lose capability to trip battery chargers EDE-BC-1A and EDE-BC-1C for an under voltage on their respective dc bus (indicative of a bus fault). (circuits 5 & 6)
8. Lose capability to trip non-safety related inverter ED-I-2A dc supply breaker within 15 minutes when ED-I-2A is drawing current from safety related switchgear EDE-SWG-11C. (circuit 6)
9. Lose position control capability for letdown control valve CS-HCV-189 resulting in a valve close signal. (circuit 7; MM-UQ-771A)
10. Lose position control capability for Train A RHR heat exchanger outlet flow control valve RH-HCV-606 resulting in a valve open signal. (circuit 7; MM UQ-773A)
11. Lose position control for boron thermal regeneration (BTR) diversion valve CS-HCV-387 resulting in a valve open signal. Valve goes full open resulting in full flow through the BTR demineralizers and either full boration or full dilution depending on the current mode of operation. (circuit 7; MM-UQ-771A)
12. Lose position control for residual heat removal (RHR) pumps to letdown heat exchanger CS-E-4 isolation valve CS-HCV-128 resulting in a valve close signal. Valve is closed in Modes 1-3. (circuit 7; MM-UQ-771A)
13. Lose position control for charging pump to regen heat exchanger CS-E-2 isolation valve CS-HCV-182 resulting in a valve open signal. Valve is normally throttled to control RCP seal injection flow. (circuit 7; MM-UQ-771A)
14. Lose the non-safety related ATWS Mitigation System (AMS) signal to both the motor and turbine driven EFW pumps. (FW-P-37A & 37B). (circuit 15; MM-CP-470)
15. Lose the capability to start, or maintain running, the Train B boric acid transfer pump on a non-safety related makeup water permissive. (circuit 15; MM-CP-470)
16. Lose the capability to automatically operate the circuit breaker for the backup group B pressurizer heaters on various non-safety related pressurizer level and pressure signals. Circuit breaker is normally open. (circuit 15; MM-CP-470)
17. Lose the capability to open the Train B pressurizer power operated relief valve (PORV) block valve on various non-safety related pressurizer temperature and pressure signals. Valve is normally open. (circuit 15; MM-CP-470)
18. Lose the capability to open the Train B pressurizer power operated relief valve (PORV) on various non- safety related pressurizer temperature and pressure signals. Valve is normally closed. (circuit 15; MM-CP-470)
19. Lose the Train A thermal barrier circulating water pump auto start signal on low thermal barrier flow.

(circuit 19; MM-CP-297A)
20. Lose the capability to provide a close signal to the charging pump mini-flow isolation valve on hi pump flow and SI. (circuit 19; MM-CP-297A)
21. Lose the capability to provide a close signal to the emergency feedwater valves on high flow. (circuit 19; MM-CP-297A)
22. Lose the capability to trip the PCCW pumps on high PCCW header temperature. (circuit 19; MM-CP-297A)
23. The EDG jacket coolant temperature control valve (1-DG-TCV-7A-1) and Air Cooler Coolant Temperature Control Valve (1-DG-TCV-7A-2) fail to the full cooling position. Controllers capability to control the jacket coolant and air cooler coolant temperature is lost. (circuit 17)

EDE-PP-11 E - Loss of Power Effect
1. Isolate the control building makeup air supply from loss of RM-RM-6506A and 6507A. (circuits 1 & 2)
2. Lose the capability to manually or automatically start the EDG-1.A room ventilation fans. The return air damper opens. (circuit 6)
3. Lose capability for Train A control of the four MSIVs. (circuits 7 & 9)
4. RM-RM-6527A is disabled. Train A containment ventilation isolation (CVI) is generated. Containment on-line purge system isolates and loses ability to control containment pressure. Also, lose the containmen1 pre-entry and refueling purge systems. (circuit 10)
5. Lose the capability for the Train A high energy line break (HELB) isolation control system to close PAB auxiliary steam isolation valve AS-V-175, letdown isolation valve CS-V-149, and steam blow down isolation valves SB-V-1, 3, 5 & 7. (circuit 17; MM-CP-486A)
6. Lose recording capability on remote shutdown panel MM-CP-108A for WG Wide Range Level, Pressurizer Level, and Wide Range Hot Leg / Cold Leg temperature. (circuit 4, MM-CP-108A)