NEXTera® ENERGY SEABROOK

October 10, 2017

10 CFR 50.90

10 CFR 50.12

SBK-L-17160

Docket No. 50-443

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

Seabrook Station

License Amendment Request 17-05

Deletion of Operator Action and Request for Exemption from Section III.G.2.b of 10 CFR 50, Appendix R

Pursuant to 10 CFR 50.90, NextEra Energy Seabrook, LLC (NextEra) is submitting License Amendment Request (LAR) 17-05 to delete an operator action in the Seabrook Station current licensing basis related to removing power from the control rod drive motor generator sets by tripping the offsite power switching station breakers during a fire event. In accordance with 10 CFR 50.12, this submittal also includes a request for an exemption from the requirements of 10 CFR 50, Appendix R, Section III.G.2.b related to cable separation and automatic fire suppression.

The enclosure to this letter provides NextEra's evaluation of the proposed change. Attachment 1 to the enclosure provides markups of the report "Fire Protection of Safe Shutdown Capability (10 CFR 50, Appendix R)" showing the proposed changes. Attachment 2 contains the associated exemption request.

As discussed in the evaluation, the proposed changes do not involve a significant hazards consideration pursuant to 10 CFR 50.92, and there are no significant environmental impacts associated with the change.

The Station Operation Review Committee has reviewed the proposed license amendment. In accordance with 10 CFR 50.91(b) (1), a copy of this letter is being forwarded to the designee of the State of New Hampshire.

There are no new or revised commitments made in this submittal.

NextEra requests NRC review and approval of this license amendment request and exemption request by October 31, 2018 and implementation within 90 days.

Should you have any questions regarding this letter, please contact Mr. Ken Browne, Licensing Manager, at (603) 773-7932.

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

Executed on October 10, 2017

Sincerely,

Eric McCartney
Regional Vice President - Northern Region
NextEra Energy

Enclosure: Evaluation of the Proposed Change

cc: NRC Region I Administrator
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Enclosure

NextEra Energy Seabrook's Evaluation of the Proposed Change

Subject: Deletion of Operator Action and Request for Exemption from Section III.G.2.b of 10 CFR 50, Appendix R

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Attachment 1 – Markup of report "Fire Protection of Safe Shutdown Capability (10 CFR 50, Appendix R)"

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Evaluation of the Proposed Change

1.0 SUMMARY DESCRIPTION

The NextEra Energy Seabrook, LLC (NextEra) current licensing basis credits operator action to remove power from the control rod drive motor generator (MG) sets by tripping the offsite power switching station breakers from the main control room (MCR) if a fire in the train A switchgear room prevents operation of both trains of tripping capability. NextEra proposes to delete the operator action to trip the station offsite power circuit breakers for this condition because there are no credible fires that could prevent the reactor trip breakers from tripping. With this request to delete the operator action, NextEra is also requesting an exemption from the requirements of 10 CFR 50, Appendix R, Section III.G.2.b for a minimum redundant train separation distance of 20 feet and automatic fire suppression in the area for the reactor trip breakers.

Appendix R to 10 CFR 50 applies to licensed nuclear power electric generating stations that were operating prior to January 1, 1979. Although not licensed and operating at that time, Seabrook was subsequently licensed with a fire protection program that met the requirements of Appendix R.

2.0 DETAILED DESCRIPTION

2.1 System Design and Operation

Reactor Trip Breakers (RTBs)

Power is provided to the control rod drive mechanisms by two MG sets. The AC power is distributed to the rod control power cabinets through the two series-connected RTBs, which are both located in the train A essential switchgear room. There are four breakers total, two train A and two train B. Each train has a RTB and a bypass RTB. The bypass RTBs are normally removed from service except during testing of the RTBs.

The safety function of these breakers is to open to trip the reactor. These breakers can be opened manually with a control switch on the main control board or automatically upon receipt of a reactor trip signal.

2.2 Current Licensing Basis (CLB)

The CLB credits operator action to remove power from the MG sets by tripping the offsite power switching station breakers from the MCR if a fire in the train A switchgear room prevents operation of both trains of tripping capability. The removal of power from the MG sets will, after some time delay to allow for coast down of the MGs, result in de-energizing and insertion of the control rods.

2.3 Reason for the Proposed Change

After tripping the offsite power breakers to remove power from the MG sets, the reactor coolant pumps would coast down on a loss of power. This could result in a loss of forced reactor coolant system flow before the MG sets coast down sufficiently for the control rods to drop into the core and trip the plant. No evidence has been found that this condition had been considered during original preparation of the Appendix R Report. Therefore, NextEra is proposing to delete the operator action to remove power from the MG sets.

2.4 Description of the Proposed Change

Seabrook Station document "Fire Protection of Safe Shutdown Capability (10 CFR 50, Appendix R)" (Appendix R Report) [Reference 1] evaluates a fire in the train A switchgear room and provides the following for the effect of the fire on the reactor trip switchgear:

4. Reactor Trip switchgear CP-CP-111

   Redundant trains of cables and equipment are located in proximity. These breakers are tripped from the MCR as an initial operator action; however, a fire in the area of the reactor trip switchgear could prevent operation of both trains of tripping capability. Should this occur the operators can remove power from the reactor trip MG sets by tripping the switching station breakers that supply power to the unit auxiliary transformer (UAT) and reserve auxiliary transformer (RAT) causing a loss of offsite power to the station. This trip can be initiated from the MCR as the switching station breaker control circuits are not routed through this fire area. The removal of power from the MG sets will, after a short time delay to allow for coast down, result in de energizing the reactor trip solenoids and; hence, insertion of the control rods.

   The safe shutdown requirements are satisfied.

NextEra proposes to delete the operator action to trip the station offsite power breakers for a fire in the train A essential switchgear room because there are no credible fires that could prevent the RTBs from tripping. This request is accompanied with a request in Attachment 2 for an exemption from the requirements of 10 CFR 50, Appendix R, section III.G.2.b, for a minimum redundant train separation distance of 20 feet and automatic fire suppression in the area for the RTBs.

3.0 TECHNICAL EVALUATION

3.1 Cable Analysis:

Operation of the manual reactor trip switches on the main control board (MCB) can initiate a reactor trip via two circuits. First, the RTBs can be directly tripped by the switch contacts closing and energizing the shunt trip coils. Second, the RTBs can be directly tripped by switch contacts opening and de-energizing the under voltage (UV) trip coils.

A conductor-to-conductor short in the cables carrying the switch contact signal to the shunt trip coil will trip the RTBs. A hot short from another cable from the same battery supply would likewise trip the RTBs. The only cable failure that could disable the shunt trip coil would be an open circuit that would prevent the shunt trip coil from being energized when a switch contact closed. Fire induced open circuits are considered very unlikely. A circuit failure that caused the circuit fuse to blow (a form of open circuit) would also disable the shunt trip circuit. The train A shunt trip signal cables are routed in cable trays and conduits in the train A switchgear room. The train B shunt trip signal cables are routed in conduits in the train A switchgear room making them much less likely to be damaged (open circuited).

The train A and B UV trip circuits are powered from their respective train solid state protection system (SSPS). The train A SSPS receives its power supply from the train A switchgear room and the train B SSPS receives its power from the train B switchgear room. If the power supply is interrupted, the output voltage to the UV trip coil will be removed, which initiates an UV trip. The train B SSPS power supply cables are not routed in the train A switchgear. The train A UV trip signal cables are routed in cable trays in the train A switchgear room. An open circuit cable failure would de-energize the UV coil. The 48 VDC signal to the UV trip coil is provided by isolated (ungrounded) power supplies. Since two correct polarity hot shorts (+ to + and - to -) do not need to be considered for ungrounded DC circuits [Reference 2], it is not credible for a hot short from another cable in the cable trays to energize the UV coil and maintain the UV coil energized when an UV trip signal is initiated by operation of the manual reactor trip switches. The train B UV trip cables are routed in conduits in the train A switchgear. The only cables in the conduit are the UV trip signal cables so there is no potential for a hot short from another cable to energize the UV coil and maintain the UV coil energized when an UV trip signal is initiated by operation of the manual reactor trip switches. In addition, there are no other known 48 VDC circuits in the train A switchgear that could be a hot short source. A short to ground would not prevent removal of the 48 VDC signal from initiating an UV trip. A conductor-to-conductor short would reduce the voltage to zero initiating an UV trip.

The circuit failure analysis shows that there are no credible cable failure modes that would prevent the RTBs from tripping. This included consideration of hot shorts, shorts to ground, conductor-to-conductor shorts, and open circuits. Furthermore, cable damage sufficient to cause spurious actuation or prevent operation of connected equipment does not occur immediately at the start of a fire. It takes some time for the fire to reach a temperature sufficient to cause cable damage, more time for the cable jacket to degrade, and more time for the conductor insulation to degrade sufficiently for the conductors to short together, short to ground, or open. In response to a fire in the train A switchgear room, the operators would implement procedure OS1200.01, "Safe Shutdown and Cooldown from the Main Control Room." Since initiating a manual reactor trip is the step one in procedure OS1200.01, the trip would occur before cables were damaged.

3.2 Fire Area Analysis

The reactor trip switchgear metal enclosed construction minimizes the potential for both RTBs to be disabled by a fire before at least one breaker could open. This is developed further in the following paragraphs to show that it is very unlikely that the breaker operating mechanisms could be damaged before opening for a reactor trip.

Based on the fire hazard analysis in the Seabrook Station "Evaluation and Comparison to BTP APCSB 9.5-1, Appendix A" (Appendix A Report) [Reference 3], the fire loading in the train A switchgear room is limited to plastics and a small amount of hydraulic fluid stored in the room. Electrical cables are not considered to contribute to the fire loading because of their thermoset insulation. The Appendix A Report states that all cables are IEEE 383 qualified, and therefore, do not propagate fire. The MG set lubrication is not listed as combustible loading indicating that the amount of contained oil/grease is less than one pound and is not considered combustible. This is supported by the MG set nameplates, which indicate about 3.5 oz of grease per MG set.

The Appendix A report describes a design basis fire in the train A switchgear room. The combustible loading in this area includes fiberglass ladders, and a circuit breaker remote racking tool.

The remote racking tool contains several pounds of plastics and approximately one pound of hydraulic fluid. As described in the Appendix A Report, the hydraulic fluid is assumed to spill on the floor and cover an area of 12.8 ft^2. The ladder and remote racking tool storage area is at the opposite end of the switchgear room from the reactor trip switchgear (RTS). The Appendix A Report criteria did not result in the need to consider a fire in the immediate area of the RTS. Although the combustible loading can change over time, the area in front of the RTS is not suitable for storage of materials. Therefore, combustible loading would not change in this immediate area.

The train B reactor trip breaker (RTB-B) is located about 27 inches above the floor and the train A reactor trip breaker (RTB-A) about 49 inches above the floor. The nearest exposed cables are in cable trays about four feet above the top of RTB-A and about six feet horizontally, which is sufficient to ensure that a fire in the cable trays would not directly impact the RTBs. Both RTBs are about 52 inches horizontally from a concrete wall of the room containing one of the MG sets. An Appendix R emergency light battery pack is mounted on the wall directly across from RTB-A. These type battery packs are metal enclosed and are judged to have no fire potential. A communication terminal box is mounted on the wall, but not directly across from the RTBs, and is judged to have no fire potential. A 120 VAC distribution panel is mounted on the wall about five feet diagonally from the RTBs. The charcoal filter fire detection control panel is located on the wall between the MG sets at least 15 feet from the RTBs. Since these panels are metal enclosed and not directly in front of the RTBs, they are judged to have no potential to damage the RTBs. Therefore, there is no permanent electrical equipment that could fail (burn) and directly impact the RTBs.

The MG sets are located in concrete walled rooms with metal doors. One wall for one of the rooms is located directly in front of the RTBs. The door for this room is located in a wall oriented 90° with respect to the wall directly in front of the RTBs. This door is over seven feet from the RTBs. The door for the other room faces the RTBs at a diagonal distance of over 15 feet. Although the doors are not fire rated, they are metal which would delay fire spread from the rooms. There is a louver above each door for room ventilation. Although the louvers are not fire rated, they do contain a fire damper that would automatically close to isolate a MG set fire at a set temperature. There is a fire detector in each MG set room to provide early detection of a MG set fire. Therefore, given the small amount of combustible materials (less than one pound) in each room, the concrete walls, and the door and louver orientation, the RTBs would be tripped from the MCR before they could be affected by a fire in the MG set rooms.

The RTS is of metal enclosed construction including a metal door for each RTB cubicle. In the connected position, the fronts of the RTBs inside the cubicles are several inches from the door. There is also a metal faceplate on the individual RTBs providing additional operating mechanism protection. The RTBs are at least 27 inches above the floor. Even if a fire is postulated directly in front of the RTS, the height above the floor, the heat shielding effect of the metal door and faceplate, and the distance between the door and the breaker faceplates would provide a time delay before the RTBs could be damaged. There is fire detection in the train A switchgear room, which would provide early detection. Therefore, there is more than sufficient time for tripping the RTBs from the MCR per procedure.

Although there are no permanent combustible materials in front of the RTBs per the Appendix A Report, the potential for transient combustibles needs to be considered for this evaluation. Procedure FP 2.2, Control of Combustible Materials, limits the amount of transient combustibles allowed in the train A switchgear room as a safety related area. Transient combustibles cannot be

stored directly in front of the RTS because this space also serves as a walkway to access the MG sets and the charcoal filter fire detection panel, i.e., it is not a through passage. There is also a fire extinguisher mounted on the wall directly in front of the RTS. Procedure FP 2.2 requires a three foot unobstructed pathway to all plant fire equipment, which includes the fire extinguisher and the fire detection panel. The RTS are classified trip critical such that transient combustibles would not be stored in front of the RTS because of the risk associated with an inadvertent plant trip. MG set maintenance is performed during refueling outages eliminating the potential for introduction of related transient combustibles. Therefore, transient combustibles do not pose a significant risk to the RTB.

The above analysis shows that there are no credible fires that could damage the RTS and prevent the RTBs from tripping prior to manual reactor trip. In order to prevent a RTB from tripping, a fire would need to cause physical damage to the breaker. This is unlikely to occur due to the limited permanent and transient combustibles in the vicinity of the RTS. In response to a fire in the train A switchgear room, the operators would implement procedure OS1200.01, Safe Shutdown and Cooldown from the Main Control Room, and initiating a manual reactor trip is the first step in the procedure. The promptness of this action ensures that the RTBs will be tripped from the MCR before the RTBs could be damaged.

3.3 Operator Action:

The operator action to trip the reactor is considered to be an "expeditious" action for reactivity control in section 3.2.2.2 of the station Appendix R Report. Section 3.2.1 of the Appendix R Report states the following in reference to expeditious actions:

> *The term "expeditious action" or "expeditiously" refers to an action taken quickly upon entry into the applicable safe shutdown procedure. These type actions are considered to be completed prior to a spurious operation of the equipment operated by the prompt and expeditious actions. Therefore, no associated timing calculation is required for these actions.*

For the purpose of this evaluation, the failure of a RTB to trip can be considered equivalent to a spurious operation. Significant damage to a cable or component would need to occur. However, section 3.1 of this evaluation explained that a hot short that could prevent a RTB trip is not a credible failure mode. A fire would need to cause physical damage to the RTBs in order to prevent a trip. Due to the physical construction of the breakers, this would likely take as long or longer to occur than a spurious operation that results from cable damage. Manually tripping the reactor from the MCR is the first step in procedure OS1200.01, "Safe Shutdown and Cooldown from the Main Control Room." The definition described above for an expeditious action can be considered to apply to a failure of a RTB to trip. Therefore, it can be expected that the operator action to trip the RTB would occur prior to a fire damaging the breakers and preventing a trip.

3.4 Conclusion:

The above analysis shows that there are no credible fires that could prevent the RTBs from tripping. In order to prevent a RTB from tripping, a fire would need to cause physical damage to the breaker. This is unlikely to occur due to the limited permanent and transient combustibles in the vicinity of the RTS. Initiation of a reactor trip is the first step in procedure OS1200.01, and it is considered an expeditious action in the Appendix R Report. Therefore, a reactor trip would occur per procedure

prior to sufficient breaker damage to prevent RTB operation. The capability to trip the RTBs from outside the train A switchgear room prior to fire damage that prevents the RTBs from tripping satisfies the safe shutdown requirements. Therefore, removal of the operator action to trip the station offsite power breakers is technically justifiable. Additional modifications would not enhance fire protection safety.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

- General Design Criterion 3, "Fire Protection," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR 50 Licensing of Production and Utilization Facilities" requires that structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effects of fires.
- 10 CFR Part 50, Appendix R Sections III.G and III.L, Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979.
- Branch Technical Position CMEB 9.5 1, Guidelines for Fire Protection for Nuclear Power Plants, Rev. 2, July 1981, Sections C.5.b and C.5.c.

4.2 No Significant Hazards Consideration

The NextEra Energy Seabrook, LLC (NextEra) current licensing basis credits operator action to remove power from the control rod drive motor generator sets by tripping the offsite power switching station breakers from the main control room if a fire in the train A switchgear room prevents operation of both trains of tripping capability. NextEra proposes to delete operator action to trip the station offsite power breakers for this condition because there are no credible fires that could prevent the reactor trip breakers from tripping

NextEra has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

   Response: No

   The proposed amendment provides technical justification for a determination that a fire-induced reactor trip breaker failure to trip could not occur. There is no physical change to structures, systems, or components. The design basis and safety function of the reactor trip breakers (RTBs) is unaffected by this change. The analysis for this change determined that, in the event of a fire, the RTBs would open before experiencing damage from the fire, and one train of safe shutdown equipment would remain functional in the event of an Appendix R fire.

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

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

   Response: No

   There is no physical change involved to any systems, structures, or components. There are no new failure modes introduced as a result of this change. There is no impact to the design function of any components, and there is no change to how they are operated. This proposed amendment provides technical justification in order to credit the reactor trip breakers as capable of tripping for a fire in the train A switchgear room.

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

3. Does the proposed amendment involve a significant reduction in margin of safety?

   Response: No.

   The ability of any operable structure, system, or component to perform its designated safety function is unaffected by the proposed changes. The proposed changes do not alter any safety analyses assumptions, safety limits, limiting safety system settings, or method of operating the plant. The changes do not adversely affect plant operating margins or the reliability of equipment credited in the safety analyses. The proposed amendment provides technical justification for a determination that a fire-induced reactor trip breaker failure to trip could not occur. Because the reactor can be reasonably expected to trip, no safety limit will be exceeded.

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

Based on the above, NextEra concludes that the proposed amendment presents no significant hazards considerations under the standards set forth in 10CFR50.92(c) and, accordingly, a finding of "no significant hazards consideration" is justified.

4.3 Conclusion

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

5.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or a significant increase in the amounts of any effluents 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 10CFR51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

1. Seabrook Station Fire Protection of Safe Shutdown Capability (10 CFR 50, Appendix R), Revision 14.
2. Generic Letter 86-10, Implementation of Fire Protection Requirements, April 24, 1986 (Enclosure 2, question 5.3.1)
3. Seabrook Station Evaluation and Comparison of BTP APCSB 9.5-1, Appendix A, Revision 15.

Attachment 1

Markup of report "Fire Protection of Safe Shutdown Capability (10 CFR 50, Appendix R)"

4. Reactor Trip Switchgear CP-CP-111

INSERT →

~~Redundant trains of cables and equipment are located in proximity. These breakers are tripped from the MCR as an initial operator action; however, a fire in the area of the reactor trip switchgear could prevent operation of both trains of tripping capability. Should this occur the operators can remove power from the reactor trip MG sets by tripping the switching station breakers that supply power to the UAT and RAT causing a loss of offsite power to the station. This trip can be initiated from the MCR as the switching station breaker control circuits are not routed through this fire area. The removal of power from the MG sets will, after a short time delay to allow for coastdown, result in de-energizing the reactor trip solenoids and; hence, insertion of the control rods.~~

~~The safe shutdown requirements are satisfied.~~

5. Charging Pump Flow Control Valve CS-FCV-121 and Flow Transmitter CS-FT-121

Under normal conditions, charging is accomplished by utilizing the control valve CS-FCV-121 and its associated transmitter. Spurious closure of this valve could isolate the seal injection path. In this event the operators will utilize the high head injection path for hot standby charging flow by opening the Train B valve SI-V139. The cables, controls and equipment required for operation of SI-V139 are not contained in the fire area. For cooldown, the operators will manually align the Train B charging pump discharge and bypass valves (CS-V219 and CS-V220) to the seal injection flow path and throttle the bypass valve as required. This operator action can be delayed for up to four (4) hours.

The safe shutdown requirements are satisfied.

INSERT

Redundant trains of cables and equipment are located in proximity. These breakers are tripped from the Main Control Room as an initial operator action. This trip could be prevented by fire damage to the breaker control circuit, or to the breaker itself.

An open circuit that prevents the shunt trip coil from energizing concurrent with a hot short that maintains the undervoltage (UV) coil energized could prevent breaker trip. The only cable failure that could disable the shunt trip coil would be an open circuit that would prevent the shunt trip coil from being energized when a switch contact closed. Fire induced open circuits are considered very unlikely. A circuit failure that caused the circuit fuse to blow (a form of open circuit) would also disable the shunt trip circuit.

The train A shunt trip signal cables are routed in cable trays and conduits in the train A switchgear room. The train B shunt trip cables are routed in conduits in the train A switchgear room making them much less likely to be damaged (open circuited). The train A and train B UV trip cables are 48V DC. The train A UV trip cables in this fire area are routed in cable trays, and the train B UV trip cables in this fire area are routed in dedicated conduit. There are no other known 48 V DC cables in this fire area. In order to maintain the UV coil energized to prevent a trip, a proper polarity hot short between these cables would need to occur. This failure mode does not need to be considered for ungrounded DC circuits.

The combustible loading in the train A switchgear room is limited to the fiberglass ladders and circuit breaker remote racking tool stored in the room, and the rod drive motor generator (MG) set lubrication. The ladder and remote racking tool storage area is at the opposite end of the switchgear room from the reactor trip switchgear (RTS).

The train B reactor trip breaker (RTB-B) is located about 27" above the floor and the train A reactor trip breaker (RTB-A) about 49" above the floor. The nearest exposed cables are in cable trays about 4' above the top of RTB-A and about 6' horizontally which is sufficient to ensure that a fire in the cable trays would not directly impact the RTBs. Both RTBs are about 52" horizontally from a concrete wall of the room containing one of the MG sets. An Appendix R emergency light battery pack is mounted on the wall directly across from RTB-A. These type battery packs are metal enclosed and are judged to have no fire potential. A communication terminal box is mounted on the wall, but not directly across from the RTBs, and is judged to have no fire potential. A 120 V ac distribution panel is mounted on the wall about 5 feet diagonally from the RTBs. The charcoal filter fire detection control panel is located on the wall between the MG sets at least 15' from the RTBs. Since these panels are metal enclosed and not directly in front of the RTBs, they are judged to have no potential to damage the RTBs.

The MG sets are located in concrete walled rooms with metal doors. One wall for one of the rooms is located directly in front of the RTBs. The door for this room is located in a wall oriented 90° with respect to the wall directly in front of the RTBs. This door is over 7' from the RTBs. The door for the other room faces the RTBs at a diagonal distance of over 15'. Although the doors are not fire rated, they are metal which would delay any fire spread from the rooms. There is a louver above each door for room ventilation. Although the louvers are not fire rated, they do contain a fire

damper which would automatically close to isolate a MG set fire. There is a fire detector in each MG set room to provide early detection of a MG set fire.

Although there are no permanent combustible materials in front of the RTBs per the Appendix A Report, the potential for transient combustibles needs to be considered. Procedures limit the amount of transient combustibles allowed in the safety related areas. Transient combustibles cannot be stored directly in front of the RTS because this space also serves as a walkway to access the MG sets and the charcoal filter fire detection panel, i.e., it is not a through passage. There is also a fire extinguisher mounted on the wall directly in front of the RTS. Procedures require a 3-foot unobstructed pathway to all plant fire equipment which includes the fire extinguisher and the fire detection panel. The RTS are classified trip critical such that transient combustibles would not be stored in front of the RTS because of the risk associated with an inadvertent plant trip. MG set maintenance is performed during refueling outages eliminating the potential for introduction of related transient combustibles.

The RTS is of metal enclosed construction including a metal door for each RTB cubicle. In the connected position, the fronts of the RTBs inside the cubicles are several inches from the door. There is also a metal faceplate on the individual RTBs providing additional operating mechanism protection. The RTBs are at least 27" inches above the floor. Even if a fire is postulated directly in front of the RTS, the height above the floor, the heat shielding effect of the metal door and faceplate, and the distance between the door and the breaker faceplates would provide a significant amount of time before the RTBs could be damaged. This is more than sufficient time for tripping the RTBs from the Main Control Room per procedure. The manual reactor trip is step 1 in the procedure. The promptness of this action ensures that the RTBs will be tripped from the Main Control Room before the RTBs could be damaged.

A deviation from Appendix R, Paragraph III.G.2.b has been approved for this fire area.

The safe shutdown requirements are satisfied.

25. Charging Pump CS-P-2A and High Head Injection Valve SI-V-138

Either charging pump CS-P-2A or CS-P-2B is normally operating. High head injection valve SI-V-138 is normally closed. If SI-V-138 spuriously opens, CS-P-2A and CS-P-2B need to be stopped to isolate charging flow to prevent pressurizer overfill. If CS-P-2A can not be stopped from the main control room because its cables are routed through this fire area, then power will be removed from Emergency Bus E5 to stop the pump (see Item 10 analysis). A fire in this area does not affect the capability to trip CS-P-2B from the main control room.

C. Evaluation

~~The safe shutdown requirements and Appendix R separation requirements are satisfied.~~

Deviations from the Appendix R, Paragraph III.G.2 separation requirements exist in the Train A Switchgear room, and are analyzed above. A deviation for Appendix R, Paragraph III.G.2.b, "Separation of cables and equipment of redundant trains by a horizontal distance of more than 20 feet. In addition an automatic suppression system shall be installed", has been approved. This deviation is justified based on the analysis and our assertion that additional modifications would not enhance fire protection safety.

SEABROOK STATION	Fire Protection of Safe Shutdown Capability 10CFR50, Appendix R Safe Shutdown Capability	Rev. 5 Section 3.7 Page 3.7-1

3.7 DEVIATIONS FROM 10CFR50 APPENDIX R

Fire Area	Section Located In Report	Equipment/System	Type Of Deviation From Appendix
C-F-1-Z/C-F-2-Z/	3.2.7.1 B.2.c	CC-V-57, 121, 176, 256	III.G.2.d
C-F-3-Z	3.2.7.1 B.2.k	Pressurizer Heaters	III.G.2.d
	3.2.7.1 B.2.l	RC-PCV-456A, B	III.G.2.d
	3.2.7.1 B.2.n	SI-V3, SI-FV-2475, 2476	III.G.2.d
	3.2.7.1 B.2.o	SI-V32, SI-FV-2477, 2486	III.G.2.d
	3.2.7.1 B.2.p	SI-V-17, SI-FV-2482, 2483	III.G.2.d
	3.2.7.1 B.2.q	SI-V-47, SI-FV-2495, 2496	III.G.2.d
	3.2.7.1 B.2.u	NI-NE-6690, 6691	III.G.2.d
	3.2.7.1 B.2.v	RC-LT-459, 460	III.G.2.d
	3.2.7.1 B.2.x	RC Hot Leg Temp.	III.G.2.d
CB-F-2C-A	3.2.7.10.B.2	CBA	III.G.2.c Auto Fire Suppression
CB-F-3A-A	3.3.9.2	Control Room/RSS	III.G.3 - Fixed Fire Suppression
CB-F-3B-A	3.3.9.3	HVAC Equipment & Duct Area - Control Room	III.G.3 - Fixed Fire Suppression
CE-F-1A-Z/	3.2.7.17 B.f	EAH-AC-2A, -2B, EAH-FN-5A,	III.G.2.b - Separation 20'
PP-F-XX-Z		-5B, EAH-DP-3A, -3B	III.G.2.c - Auto Fire Suppression
DG-F-3A-Z/	3.2.7.41 B.2.b	DAH-FN-25A, -25B	III.G.2.b - Separation 20'
DG-F-3B-Z			III.G.2.c - Auto Fire Suppression
CB-F-1A-A	3.2.7.2 B.4	CP-CP-111	III.G.2.b - Separation 20', Auto Fire Suppression

Attachment 2

Request for Exemption from Section III.G.2.b of 10 CFR 50, Appendix R

1.0 BACKGROUND INFORMATION

10 CFR 50, Appendix R, Section III.G.2.b requires, "Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area…" NextEra Energy Seabrook, LLC (NextEra) requests a permanent exemption from the separation and fire suppression criteria of 10 CFR 50, Appendix R, Section III.G.2.b as it applies to fire area CB-F-1A-A, train A essential switchgear room. The exemption would apply to the reactor trip switchgear where both trains of redundant reactor trip breakers (RTB) are located within close proximity in the same switchgear room and do not meet the criteria for separation distance and automatic fire suppression.

Seabrook Station document "Fire Protection of Safe Shutdown Capability (10 CFR 50, Appendix R)" (Appendix R Report) currently credits operator action to remove power from the control rod drive motor generator (MG) sets by tripping the offsite power switching station breakers from the main control room if a fire in the train A switchgear room prevents operation of both trains of tripping capability. The removal of power from the MG sets will, after some time delay to allow for coast down of the MGs, result in de-energizing and insertion of the control rods. After tripping the offsite power breakers to remove power from the MG sets, the reactor coolant pumps would coast down on a loss of power. Disconnecting the offsite power source could result in a loss of forced reactor coolant system flow before the MG sets coast down sufficiently for the control rods to drop into the core and trip the plant. No evidence has been found that this condition had been considered during original preparation of the Appendix R Report. Therefore, NextEra is requesting an exemption from the separation and fire suppression criteria for the reactor trip breakers in conjunction with a license amendment request that proposes to delete the operator action to remove power from the MG sets and to credit operator action to promptly initiate a manual reactor trip.

2.0 JUSTIFICATION

The NRC may grant an exemption from the requirements of 10 CFR 50 in an accordance with 10 CFR 50.12(a) provided certain criteria are met. The requested exemption from the requirements of 10 CFR 50 Appendix R, Section III.G.2.b meets the criteria of 10 CFR 50.12 as discussed below.

Authorized by Law

The criteria for granting specific exemptions from 10 CFR 50 regulations are specified in 10 CFR 50.12. In accordance with 10 CFR 50.12(a)(1), the NRC is authorized to grant an exemption upon determining that the exemption is authorized by law, will not present an undue risk to the public health and safety, and is consistent with the common defense and security.

No Undue Risk to Public Health and Safety

The underlying purpose of 10 CFR Part 50, Appendix R, Section III.G is to ensure that at least one means of achieving and maintaining safe shutdown remains available during and following a postulated fire event. The requested exemption, which relies on operator action to manually trip the reactor and the low likelihood of a fire that would prevent opening of both reactor trip breakers, dos not create any new accident precursors. Therefore, the probability and consequences of postulated accidents are not increased. Therefore, there is no undue risk to public health and safety.

Consistent with Common Defense and Security

The requested exemption is not related to security issues. Therefore, the common defense and security is not diminished by this exemption.

Special Circumstances

One of the special circumstances described in 10 CFR 50.12(a)(2)(ii) is that the application of the regulation is not necessary to achieve the underlying purpose of the rule. The underlying purpose of 10 CFR Part 50, Appendix R, Section III.G is to ensure that at least one means of achieving and maintaining safe shutdown remains available during and following a postulated fire event. While NextEra does not comply with the explicit requirements of Section III.G.2, credit for operator action in conjunction with the determination that no credible fire would prevent opening of the reactor trip breakers ensures that a train of equipment necessary to achieve and maintain safe shutdown of the plant will be available in the event of a fire in the switchgear room containing the reactor trip switchgear. Therefore, application of the regulation is not necessary to achieve the underlying purpose of the rule, and special circumstances exist as required by 10 CFR 50.12(a)(2)(ii).

3.0 ANALYSIS

The enclosure to this submittal provides a detailed analysis for the requested exemption in Section 3.0, Technical Evaluation. Following are the conclusions from the evaluation in the enclosure, which included a cable analysis, fire area analysis, and credit for operator action.

Cable Analysis

The circuit failure analysis shows that there are no credible cable failure modes that would prevent the RTBs from tripping. This included consideration of hot shorts, shorts to ground, conductor-to-conductor shorts, and open circuits. Furthermore, cable damage sufficient to cause spurious actuation or prevent operation of connected equipment does not occur immediately at the start of a fire. It takes some time for the fire to reach a temperature sufficient to cause cable damage, more time for the cable jacket to degrade, and more time for the conductor insulation to degrade sufficiently for the conductors to short together, short to ground, or open.

Fire Area Analysis

The analysis shows that there are no credible fires that could damage the reactor trip switchgear and prevent the RTBs from tripping prior to manual reactor trip. In order to prevent a RTB from tripping, a fire would need to cause physical damage to the breaker. This is unlikely to occur due to the limited permanent and transient combustibles in the vicinity of the RTS.

Operator Action

The operator action to trip the reactor is considered to be an expeditious, and the Appendix R report discusses expeditious actions:

> *The term "expeditious action" or "expeditiously" refers to an action taken quickly upon entry into the applicable safe shutdown procedure. These type actions are considered to be completed prior to a spurious operation of the equipment operated by the prompt and expeditious actions. Therefore, no associated timing calculation is required for these actions.*

The failure of a RTB to trip can be considered equivalent to a spurious operation. Significant damage to a cable or component would need to occur to prevent a RTB from opening; however, a hot short that could prevent a RTB trip is not a credible failure mode. A fire would need to cause physical damage to the RTBs in order to prevent a trip. Due to the physical construction of the breakers, this would likely take as long or longer to occur than a spurious operation that results from cable damage. The definition described above for an expeditious action can be considered to apply to a failure of a RTB to trip. In response to a fire in the train A switchgear room, the operators would implement procedure OS1200.01, Safe Shutdown and Cooldown from the Main Control Room, and initiating a manual reactor trip is the step one in the procedure. Therefore, it can be expected that the operator action to trip the RTB would occur prior to a fire damaging the breakers and preventing a trip.

Conclusion

The analysis shows that there are no credible fires that could prevent the RTBs from tripping. In order to prevent a RTB from tripping, a fire would need to cause physical damage to the breaker. This is unlikely to occur due to the limited permanent and transient combustibles in the vicinity of the RTS. Initiation of a reactor trip is the first step in procedure OS1200.01, and it is considered an expeditious action in the Appendix R Report. Therefore, a reactor trip would occur per procedure prior to sufficient breaker damage to prevent RTB operation. The capability to trip the RTBs from outside the train A switchgear room prior to fire damage that prevents the RTBs from tripping satisfies the safe shutdown requirements. Therefore, removal of the operator action to trip the station offsite power breakers and credit for operator action to expeditiously trip the reactor are justified.

4.0 PRECEDENT

The NRC has previously granted exemptions from the requirements contained in Section III.G.2 of 10 CFR 50 Appendix R based on manual actions:

- Millstone Unit 2 - exemption from certain technical requirements of 10 CFR Part 50, Appendix R, Section III.G.2 (III.G.2) for the use of operator manual actions (OMAs) in lieu of meeting the circuit separation and protection requirements contained in III.G.2, August 3, 2017 (ML17209A765)

- Fitzpatrick - exemption from certain technical requirements of 10 CFR Part 50, Appendix R, Section III.G.2 (1II.G.2) for the use of an operator manual action (OMA) in lieu of meeting the circuit separation and protection requirements contained in III.G.2, March 11, 2010 (ML100340670)

5.0 SCHEDULE

NextEra requests approval of the exemption request in conjunction with approval of the accompanying license amendment request by October 31, 2018.