Omaha Public Power District

LIC-16-0011
April 4, 2016

10 CFR 50.90

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

Fort Calhoun Station (FCS), Unit 1
Renewed Facility Operating License No. DPR-40
NRC Docket No. 50-285

Subject: Notification of Alternative Implementation of REC-111 and REC-137 from the Original License Condition

References: See Attachment, Section 3.0

This letter is to notify the NRC of alternative implementation of two proposed modifications identified as Transition Licensing Conditions under Amendment Number 275 to Renewed Operating License DPR-40 for Fort Calhoun Station (FCS) Unit No.1, operated by the Omaha Public Power District (OPPD).

Amendment No. 275 to Renewed Operating License DPR-40 addressed OPPD's transition to a risk-informed, performance-based fire protection program based on National Fire Protection Association (NFPA) 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition" (NFPA 805), in accordance with 10 CFR 50.48(c). As part of the Transition License Conditions, OPPD proposed plant modifications listed in Table S-2 of OPPD letter LIC-14-0042, dated April 10, 2014, as stated in Operating License section 3.D.(3)(b) of DPR-40.

For each item in Table S-2, a "Proposed Modification" description was provided. In the case of two items (REC-111 and REC-137), these descriptions included statements referring to OPPD plans to communicate to the NRC updated information, as appropriate, with respect to potential changes to these proposed modifications. Further consideration of the proposed modifications subsequent to the approval of Amendment 275 has resulted in the conclusion that changes to the proposed modifications are appropriate.

The attachment to this letter provides OPPD's description and evaluation of the changes to these RECs. OPPD will provide an update to Table S-2 as part of the next License Amendment Request (LAR) application affecting the Table.

Commitment made in this letter are summarized in the attached table, "SUMMARY OF REGULATORY COMMITMENTS."

If you should have any questions regarding this submittal or require additional information, please contact Mr. Bradley H. Blome at 402-533-7270.

Respectfully,

Shane M. Marik
Site Vice President and CNO

SMM/epm

Attachments: OPPD's Evaluation of Alternative Implementation of NFPA 805 Modifications
SUMMARY OF REGULATORY COMMITMENTS

c: M. L. Dapas, NRC Regional Administrator, Region IV
C. F. Lyon, NRC Senior Project Manager
S. M. Schneider, NRC Senior Resident Inspector

**OPPD's Evaluation of Alternative Implementation of NFPA 805 Proposed Modifications**

## 1.0 Summary of Alternative Implementation of Two NFPA 805 Proposed Modifications

This evaluation provides the basis for alternative implementation of two proposed modifications identified as Transition Licensing Conditions under Amendment No. 275 to Renewed Operating License DPR-40 for Fort Calhoun Station (FCS) Unit No.1, operated by the Omaha Public Power District (OPPD).

Amendment No. 275 to Renewed Operating License DPR-40 addressed OPPD's transition to a risk-informed, performance-based fire protection program based on National Fire Protection Association (NFPA) 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition" (NFPA 805), in accordance with 10 CFR 50.48(c). As part of the Transition License Conditions included in Amendment No. 275, OPPD proposed modifications to address thirty plant items listed in Table S-2 of OPPD letter LIC-14-0042, dated April 10, 2014 (Reference 3.3), as stated in section 3.D.(3)(b) of DPR-40.
For each item in Table S-2, a "Proposed Modification" description was provided. In the cases of two items (i.e., REC-111 and REC-137), these descriptions included statements referring to OPPD plans to communicate to the NRC updated information as appropriate with respect to potential changes to these proposed modifications. Further consideration of the proposed modifications subsequent to the approval of Amendment No. 275 has resulted in the conclusion that changes to the proposed modifications are appropriate. This conclusion is based on the determination that one of the proposed modifications may not be effective as a solution to the original concern and the other modification is not necessary to meet performance requirements of NFPA 805. Consequently, OPPD has identified alternative solutions for these two modifications. The subject modifications are:

1. High Energy Arc Fault (HEAF) Shields above 4160 VAC and 480 VAC Switchgear (REC-111)
2. Alternate Water Supply from the Main Condenser to AFW Pump FW-54 (REC-137)

The original proposed modification for REC-111 will be replaced with an alternative modification that more effectively addresses the possible consequences of fires in the switchgear rooms.
The original proposed modification for REC-137 will be replaced with administrative controls that will ensure that the performance requirements of NFPA 805 are met.
These alternative solutions address their respective problem statements in Table S-2. This letter serves to communicate to the NRC regarding these alternative solutions for REC-111 and REC-137, as discussed in the "Proposed Modification" descriptions for these items. Specifically, Letter LIC-14-0042, Table S-2, REC-111 states:

> "OPPD is also considering plant modifications to reduce the scope of, or potentially replace, the HEAF barrier installation. These modifications are primarily to prevent loss of offsite power during switchgear room fire events. OPPD plans to notify the NRC if these modifications are pursued in lieu of the HEAF barriers described herein."

Letter LIC-14-0042, Table S-2, REC-137 states:

> "…the design change and deviations from the design change as conceptually described will be communicated to the NRC. The design change will also ensure provisions for the alignment of one or more makeup water supplies to FW-54 following the 24-hour safe and stable coping time for NFPA 805."

The alternative solutions continue to ensure that the fire protection program:

1. Satisfies the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release;
2. Maintains safety margins; and
3. Maintains fire protection defense in depth (fire prevention, fire detection, fire suppression, mitigation, and post fire safe-shutdown capability).

## 2.0 Detailed Description

### 2.1 High Energy Arc Fault Shields above 4160 VAC and 480 VAC Switchgear (REC-111)

System Description

The FCS electrical distribution system consists of two independent trains housed in separate switchgear rooms identified as fire areas 36A (east switchgear room) and 36B (west switchgear room). Each train has a safety related 4160 VAC bus, designated as 1A3 for train A and 1A4 for train B, from which lower voltage distribution buses are derived. Two offsite power sources are available to supply power to buses 1A3 and 1A4. One offsite source is the 161 kV substation; the second is the 345 kV substation. Both substations are located in the FCS switchyard on the OPPD property, adjacent to the plant. The normal source of power to buses 1A3 and 1A4 is the 161 kV supply with the 345 kV source configured as a backup. Buses 1A3 and 1A4 are also backed up by train-dedicated diesel generators that are automatically placed in service when offsite sources are not available.

The 4160 VAC circuit breakers and associated cables that control the alignment of offsite power to buses 1A3 and 1A4 are located in the switchgear rooms and are separated by train. High voltage circuit breakers located in the switchyard can be controlled from the main control room via cables that are currently routed through both switchgear rooms, i.e. through both fire areas 36A and 36B. Refer to the attached one-line diagram, Figure 1, for additional details regarding the layout of the FCS electrical distribution system.

Background

OPPD letter LIC-14-0042, Table S-2, Line Item REC-111 (Reference 3.3) committed to the installation of high energy arc fault (HEAF) shields between the top of 4160 VAC and 480 VAC switchgear and the lowest elevation cable trays above the switchgear. Similar shielding would be installed between the high voltage bus ducts in the switchgear rooms and adjacent cables trays. The intended purpose of the proposed shields was to minimize damage to cables from a HEAF occurring within the switchgear or medium voltage (i.e. 4160 VAC) bus ducts.

A modification was originally determined to be necessary to reduce overall risk as calculated by the fire PRA. A modification to install HEAF shielding was proposed to reduce the probability of a loss of offsite power (LOOP) followed by a station blackout (SBO). Cables that control breakers associated with offsite power sources are routed in both switchgear rooms resulting in the possibility of a fire-induced LOOP. In the event of such a fire-induced LOOP, a single random failure of the unaffected diesel generator could cause the event to progress to a SBO. In this scenario, offsite power may not be restorable due to damage to switchyard breaker control cables and control circuit components. Note that the deterministic compliance strategies for a fire in either switchgear room each assume full area burn; i.e., a LOOP due to a fire in either switchgear room is assumed but the diesel generator associated with the unaffected train would be available for supplying plant buses.

During consideration of the HEAF shield modification, it was identified that the proposed shields may not be capable of providing the needed protection from a HEAF. Specifically, if a HEAF is not immediately isolated by protective relays, it is difficult to determine precisely how much energy is released during such an event. Further, space for installing the shields is limited and may not permit proper sizing such that the shields could be assured of the capability to protect required cables.

In addition to the possible damage to cables, a scenario was identified in which an arc fault within 4160 VAC breaker cubicles could result in switchgear equipment damage that would require automatic isolation by switchyard breakers for both of the high voltage supply circuits, i.e. the 161 kV and 345 kV sources. This damage scenario is not addressed by the proposed HEAF shields and may prevent the restoration of offsite power. Consequently, an alternative modification was pursued.

The alternative modification, EC 58160 (Reference 3.15), will re-route selected cables so that a HEAF and subsequent fire occurring in either switchgear room would not impair the capability of operators to restore offsite power. The modification would re-route cables associated with the control of switchyard breakers so that they would not be impacted by the postulated HEAF. In a worst case HEAF scenario, it would be possible for offsite power to be lost due to actuation of protective relays. However, with the offsite power control cables re-routed, offsite power restoration to the unaffected train would be possible during an event occurring in either switchgear room. This alternative modification would also revise plant fire procedures to provide guidance to operators for isolating the fault and restoring offsite power to unaffected buses.

Evaluation of Alternative Solution for Meeting NFPA 805 Requirements (REC-111)

As stated above, the original commitment to install HEAF shields was primarily based on the need to preserve the capability of restoring offsite power during a switchgear room fire-induced SBO, as determined by the fire PRA. Deterministic compliance strategies for the switchgear room fires did not and do not rely on the installation of the HEAF shields since they are required to assume a full area burn for each room and rely on the operation of the unaffected switchgear room and diesel generator for station power in order to meet NFPA 805 performance requirements for safe and stable operation. Therefore, only the fire PRA is impacted by the decision to replace the HEAF shields with an alternative modification. Deterministic compliance strategies are not impacted.

The alternative modification to the installation of HEAF shields will re-route switchgear room cables associated with the control of switchyard breakers that may require operation from the control room to restore offsite power after a HEAF or switchgear room fire. The change will also add isolation fuses to ensure that the fire does not cause switchyard breakers to lose credited control power due to damage to components located in the switchgear rooms. These changes will ensure that, for certain damage scenarios in fire areas 36A or 36B resulting from HEAF or fire, offsite power can be restored.

In some HEAF damage scenarios, it may be necessary to isolate a fire-induced fault from the unaffected power train by opening a high voltage disconnect switch located outside the control room but within the FCS protected area. This operator action will be specified in FCS Abnormal Operating Procedure AOP-06-02, Fire Emergency – Uncontrolled Areas of Auxiliary Building, Sections V and VI (Reference 3.18) and is addressed in the updated fire PRA.

For the purpose of evaluating the change in risk of the plant without the HEAF shields, the fire PRA was revised to remove credit for the proposed HEAF shields, and add credit for the planned cable reroute that will enable recovery of offsite power during certain switchgear room fires. A human reliability analysis was performed for operator actions credited for recovery of offsite power, and this action was incorporated into the fire PRA. Credit was also added for proposed administrative controls to limit risk associated with hotwork and storage of combustible materials in Room 71.

Three PRA modeling cases support evaluation of this issue.

- Case 0 – Safety Evaluation PRA – This case represents the PRA cited in the FCS NFPA 805 Safety Evaluation (SE) (Reference 3.1). This case includes credit for the modifications designated in Reference 3.2, Table S-2 as “In FPRA”. Case 0 is provided for reference and includes the risk estimates cited by the NFPA 805 Safety Evaluation (Section 3.4.6 of Reference 3.1).

- Case 1 – Updated SE PRA – This case is a revision to Case 0 to incorporate updated information and refinements. These changes are summarized in Table 1 and further documented in LTR-RAM-15-81 (Reference 3.13). As with Case 0, this case includes credit for the modifications designated in Reference 3.2, Table S-2 as "In FPRA". The PRA model updates included in Case 1 do not include changes associated with alternative implementation of REC-111.

**Table 1: Summary of PRA Model Changes from Case 0 to Case 1**

| Change to PRA Models | Explanation |
|---|---|
| Updated human reliability analysis (HRA) to NUREG-1921 | Required per PRA RAI 23.01. Required a focused-scope peer review, which was conducted in February 2015. |
| Incorporated miscellaneous refinements to the fire PRA | Changes were made to the infrastructure of the fire PRA model. These changes have no impact on the methods used (no new methods are used from those included in the RAI process). These changes were implemented to reduce extraneous data and structure, improve transparency, and improve the accuracy of the model. |
| Incorporated response to PRA RAI 25 | These changes include method improvements committed to be implemented prior to use of the self-approval model. |
| Incorporated Revision 13 of the internal events PRA model into the fire PRA model (whereas the LAR 10-07 version of the fire PRA model had used Revision 11 of the internal events PRA) | The changes to the internal events PRA model did not involve methods upgrades and did not require a peer review. |
| Incorporated recent plant design changes relevant to the fire PRA model | These plant changes were incorporated to reflect the as-built plant. |
| Improved accuracy of the source-target data | Response to NRC feedback from the 2015 Triennial Fire Protection Inspection. |
| Removed conservatisms from battery room fire scenarios | Includes credit for existing design features involving bypass power to AC instrument buses and credit for availability of main feedwater. |

- Case 2 – PRA with Updated REC-111 – This case is a revision to Case 1 to incorporate alternative implementation of REC-111. Comparison of Case 1 to Case 2 illustrates the isolated impact of alternative implementation of REC-111. The changes from Case 1 to Case 2 are summarized in Table 2 and further documented in LTR-RAM-15-81 (Reference 3.13).

**Table 2: Summary of PRA Model Changes from Case 1 to Case 2**

| Change to PRA Models | Explanation |
|---|---|
| Removed credit for originally proposed HEAF barrier modification | An alternative modification and administrative controls were identified that would limit risk to an acceptable level without the originally proposed HEAF barriers. |
| Incorporated credit for alternative modification involving cable reroute and associated operator actions that would support recovery of offsite power following certain switchgear room fire scenarios | Alternative modification proposed to limit risk to an acceptable level without the originally proposed HEAF barrier modification. |
| Incorporated credit for proposed Room 71 administrative controls | Administrative controls proposed to limit risk to an acceptable level without the originally proposed HEAF barrier modification. |

Table 3 provides the total plant CDF, total plant LERF, net VFDR ΔCDF, and net VFDR ΔLERF for the three cases. Table 3 illustrates that applicable values remain within R.G. 1.174 (Reference 3.22) Region II guidelines for total CDF ($\leq$1E-4), total LERF ($\leq$1E-5), VFDR ΔCDF ($\leq$1E-5), and VFDR ΔLERF ($\leq$1E-6) in the modeled cases.

**Table 3: Summary of Results**

| | Case 0 | Case 1 | Case 2 |
|---|---|---|---|
| | **Safety Evaluation PRA** | **Updated SE PRA** | **PRA with Updated REC-111** |
| **Net VFDR ΔCDF for NFPA 805 Transition (/yr)** | 4.93E-06 | 7.69E-06 | 6.40E-06 |
| **Net VFDR ΔLERF for NFPA 805 Transition (/yr)** | 6.27E-07 | 9.05E-07 | 7.74E-07 |
| **Total CDF* (internal events, internal flood, fire, seismic) (/yr)** | 9.21E-05 | 8.36E-05 | 8.45E-05 |
| **Total LERF* (internal events, internal flood, fire) (/yr)** | 5.34E-06 | 7.85E-06 | 7.60E-06 |

*The reported Total CDF includes 1.30E-05 /yr of seismic CDF, taken from the August 2010 NRC Generic Issue 199 Safety/Risk Assessment (Reference 3.21). The reported Total LERF does not include seismic LERF as there is no corresponding estimate for seismic LERF available. Using a bounding approach, a seismic LERF contribution of up to 2.40E-06/yr, when combined with the report Case 2 value of 7.60E-06, yields a value of 1E-5 (i.e., R.G. 1.174 Total LERF guideline). This bounding seismic LERF value corresponds to 18% of the seismic CDF value (i.e., 2.40E-06/1.30E-05). Seismic LERF contribution is expected to be lower than this bounding value, based in part on Reference 3.24.

In conclusion, the total CDF, total LERF, VFDR ΔCDF, and VFDR ΔLERF remain within R.G. 1.174 (Reference 3.22) Region II with credit for the REC-111 high energy arc fault barriers replaced with the proposed alternative.

Safety Margin

In accordance with NEI 04-02, 5.3.5.3 guidance, safety margins are considered to be maintained if Codes and Standards or their alternatives accepted for use by the NRC are met, and safety analyses acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) are met, or provides sufficient margin to account for analysis and data uncertainty.

Fire PRA and Deterministic Analysis methodologies and modeling approaches used to support the conclusions contained in this evaluation are unchanged from those used to support the approved Safety Evaluation for the FCS implementation of NFPA 805 as documented in NRC Letter NRC-14-0072 (Reference 3.1). The Safety Evaluation includes consideration of RAI responses associated with the NFPA 805 License Amendment Request as originally submitted in OPPD letter LIC-11-0099 (Reference 3.2).

Since analysis methodologies and approaches have not changed from those used to support the Safety Evaluation, it is concluded that adequate safety margin continues to be maintained.

Defense in Depth

The alternative approach to REC-111 improves Defense-in-Depth (in comparison to the original REC-111) as follows:

- The alternative approach for REC-111 modifies control circuits and upgrades procedures to provide the capability to restore offsite power to the unaffected switchgear room in the event of a HEAF with or without a concurrent emergency diesel generator failure.
- The alternative approach is based on the assumption of a full area burn in the fire-affected switchgear room. This is a conservative assumption since the alternative approach is not contingent on any fire events in the room being limited in size and/or in scope of target damage.

2.2 Alternate Water Supply from the Main Condenser to AFW Pump FW-54 (REC-137)

System Description

The FCS auxiliary feedwater system can supply water to steam generators via any of three pumps; a motor-driven pump (FW-6), a turbine-driven pump (FW-10), or a diesel-driven pump (FW-54). Pumps FW-6 and FW-10 both take suction from the Emergency Feedwater Storage Tank (FW-19). These two pumps and FW-19 are located in the uncontrolled area of the Auxiliary Building. Pump FW-54 takes suction from the Condensate Storage Tank (CST). Both FW-54 and the CST are located outside of the auxiliary building and are credited for supporting decay heat removal capability in fire scenarios for the following fire areas*:

- Fire Area 28 – Room 71 (Cable Routing)
- Fire Area 32 – Room 19 (AFW Pump and Air Compressors)
- Fire Area 34B-1 – Room 57W (Electrical Penetration)
- Fire Area 34C – Room 57E (Motor Control Center Area)
- Fire Area 36A – Room 56E (East Switchgear Room)

  *Note: In the original NFPA 805 submittal as documented in Table S-2 of Reference 3.2, FW-54 was also specified as being credited for fire areas 34A and 36B. This was incorrectly documented in Table S-2 as the compliance strategy credited the motor-driven auxiliary feedwater pump, FW-6 for these fire areas.

CST capacity is 150,000 gallons. As the tank inventory is depleted, it can be refilled from several sources including an on-site well or the local municipal water system for an indefinite period of time. The current plant configuration contains no provisions for using the main condenser as a source of water for FW-54.

Background

OPPD letter LIC-14-0042, Table S-2, Line Item REC-137 described a proposed modification that would add the capability to transfer water from the main condenser to the suction of diesel-driven pump FW-54. This modification would require installation of a new pump, motor-operated valves and associated instrumentation and controls. The new pump and valves would be controlled from the main control room and would supplement the inventory available in the CST which is the normal source of water for FW-54.

The proposed modification was originally intended to address a concern that normal CST inventory may not be adequate to supply FW-54 with 24 hours of decay heat removal capability in support of safe and stable plant operation following a fire. This concern was based on an assumption that the CST is administratively controlled at 50% level. (The 50% value was based on the setpoint for the control room alarm indicating low CST inventory.) However, plant procedures currently require the CST to be maintained at a level of 80% to 100% and operators are procedurally directed to verify that level is controlled in this range each shift. Therefore, it is reasonable to credit CST level to be normally at or above 80%. While 50% level corresponds to an inventory of approximately 75,000 gallons, 80% corresponds to approximately 120,000 gallons.

Evaluation of Alternative Solution for Meeting NFPA 805 Requirements (REC-137)

The original proposed modification for REC-137 involved installation of a new pump and valves to allow remote transfer of water from the main condenser to the suction of auxiliary feedwater pump FW-54. The purpose of the proposed pump and valves was to supplement the normal supply of water to FW-54 (i.e. the condensate storage tank (CST)), to ensure that an adequate supply would be available for decay heat removal for a 24 hour safe and stable coping time. The 24-hour coping time was established in the NFPA 805 Nuclear Safety Capability Assessment (NSCA) which is documented in Engineering Analysis EA10-036 (Reference 3.4).

The proposed modification was intended to support compliance with the deterministic requirements of NFPA 805 Chapter 4 and was not credited as an assumed configuration in the fire PRA. The modification was originally credited in the deterministic evaluations for several specific fire areas. Credit for the modification was assumed to be necessary to compensate for the assumption that the inventory in the CST could be as low as 50%, since 50% inventory was determined to be inadequate for the 24-hour coping time.

Subsequent to the original REC-137 commitment, the available CST inventory for decay heat removal was re-evaluated as documented in calculation FC08497 (Reference 3.14). This calculation determined that an indicated level of 80% in the CST is sufficient to support decay heat removal for 24 hours. The tank is procedurally required by FCS operating instruction OI-DW-3, Demineralized Water Plant Normal Operation, and Operator Log FC-77 (References 3.16 and 3.19) to contain a minimum of 80% indicated level. An indicated level of 80% bounds the required inventory to meet the 24-hour coping time for decay heat removal capability. To ensure consistency between the existing administrative controls for CST level and the control room CST low level alarm, the low level CST setpoint for the alarm will be revised to 80% from the current value of 50%. The deterministic evaluations for fire areas 28, 32, 34B-1, 34C, and 36A (EA10-036, Reference 3.4) have been revised to reflect the 24 hour coping time capability of the CST and no longer credit the modification originally proposed for REC-137. It is important to note that no postulated fires in the fire areas that credit FW-54 for decay heat removal have any adverse impact on the operation of FW-54, the CST, or any associated support equipment.

In regard to operation of FW-54 beyond 24 hours, the original REC-137 commitment stated that there would be provisions for "…the alignment of one or more makeup water supplies to FW-54 following the 24-hour safe and stable coping time…" The capability for such an alignment exists with the current plant configuration and is procedurally addressed in operating instruction OI-DW-3 (Reference 3.16). OI-DW-3 includes multiple methods for supplying makeup water to the CST for an indefinite period of time which include the option of sourcing water from the on-site well or the local municipal water supply (Blair, Nebraska water system). The transfer of water from these sources normally relies on pumps which require a power source that can be impacted by some of the fire areas crediting FW-54. However, OI-DW-3 also includes an option to bypass these pumps using alternate pumps powered from the local 161 kV substation 1251 which is not impacted by any of the fire areas of concern.

Safety Margin

The alternative approach to REC-137 maintains adequate margin as demonstrated by the following:

- Calculation FC08497 concludes that a time margin of approximately 2 hours beyond the required 24 hours is available with the minimum required inventory in the CST.
- A revised low level alarm setpoint will ensure that the CST contains the minimum required inventory during normal plant operation.
- Makeup to the CST after 24 hours will be available.
- A makeup flow path to the CST can be established regardless of the scope of fire damage to the station for the fire areas crediting the FW-54/CST success path for decay heat removal.
- Makeup to the CST can be established within one hour of the start of efforts to establish makeup.
- Once CST makeup is established, adequate inventory for continued successful operation of Pump FW-54 can be maintained for an indefinite period.

- Administrative controls will be developed to require compensatory measures if the inventory in the CST drops below 80%.

Defense in Depth

There is no change to Defense-in-Depth in regards to REC-137. The CST will contain a minimum inventory required for 24 hours of decay heat removal and success paths are available for makeup to the CST. With existing and proposed administrative limits for CST inventory in place, the station has 24 hours of inventory without having to rely on any new operator actions outside the Main Control Room. CST makeup capability is available from multiple and diverse sources after 24 hours, using upgraded procedures and operator actions outside the Main Control Room.

Conclusion

The proposed modification was intended to demonstrate compliance with the deterministic requirements of NFPA 805 and to ensure adequate decay heat removal capability for the NFPA 805 Nuclear Safety Performance Criteria (NSPC) Safe and Stable coping time. Since it has been demonstrated that the CST normally contains adequate inventory to maintain the plant in a Safe and Stable condition for 24 hours, the proposed modification is not necessary to meet NFPA 805 performance requirements.

## 3.0 References

3.1 Letter from NRC (J K. Rankin) to OPPD (L. P. Cortopassi) Fort Calhoun Station - Issuance of Amendment Regarding Transition to a Risk-Informed, Performance-Based Fire Protection Program in Accordance With 10 CFR 50.48(c) (TAC NO. ME7244) (ML14098A092)(NRC-14-0072)

3.2 Letter from OPPD (J. A. Reinhart) to NRC (Document Control Desk), License Amendment Request 10-07, Proposed Changes to Adopt NFPA 805, Performance- Based Standard for Fire Protection for Light Water Reactor Generating Plants (2001 Edition) at Fort Calhoun Station, dated September 28, 2011 (ML 112760660) (LIC-11-0099)

3.3 Letter from OPPD (L. P. Cortopassi) to NRC (Document Control Desk), “Supplement to License Amendment Request 10-07, Proposed Changes to Adopt NFPA 805, Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (2001 Edition) at Fort Calhoun Station,” dated April 10, 2014 (ML14115A296)) (LIC-14-0042)

3.4 Engineering Analysis EA10-036, NFPA 805 Deterministic Safe Shutdown Separation Analysis, Revision 1

3.5 Engineering Analysis EA10-037, NFPA 805 NSPC and Fire PRA Circuit Analysis, Cable Selection, and Cable Location, Revision 1

3.6 Engineering Analysis EA10-041, Operator Manual Action Feasibility Assessment, Revision 1

3.7 Engineering Analysis EA10-042, Non-Power Operations Modes, Revision 1

3.8 Engineering Analysis EA10-044, Fort Calhoun Station Fire Area Review / Licensing Action Review, Revision 1

3.9 Engineering Analysis EA10-062, NFPA 805 Chapter 3 Fundamental Fire Protection Program and Design Elements Review, Revision 1

3.10 Engineering Analysis EA10-064, NFPA 805 Nuclear Safety Performance Analysis Methodology Review, Revision 1

3.11 Engineering Analysis EA11-014, NFPA 805 Risk Informed Performance Based Fire Risk Evaluation of Fire Area 36A (East Switchgear Room), Revision 1

3.12 Engineering Analysis EA97-001, Updated Fire Hazards Analysis, Revision 20

3.13 Westinghouse Electric Company Letter LTR-RAM-15-81, Application Specific Evaluation of Fort Calhoun Station NFPA 805 REC-111, REC-119, and REC-120, Revision 1

3.14 Calculation FC08497, Condensate Storage Tank Inventory to Support NFPA 805 Safe and Stable Conditions, Revision 0

3.15 Engineering Change EC 58160, Restoration of Offsite Power in Support of Fire Safe Shutdown NFPA 805 Transition LAR (REC-111), Revision 0

3.16 FCS Operating Instruction OI-DW-3, Demineralized Water Plant Normal Operation, Revision 75

3.17 FCS Operating Instruction OI-DW-9, DW-68 RO Unit Water Storage Tank Basic Operation, Revision 1

3.18 FCS Abnormal Operating Procedure AOP-06-02, Fire Emergency – Uncontrolled Areas of Auxiliary Building, Sections V and VI, Revision 6

3.19 FCS Water Plant Operator Logs, Form FC-77, Revision 121

3.20 NUREG-1921*, EPRI/NRC-RES Fire Human Reliability Analysis Guidelines – Final Report*, Electric Power Research Institute, July 2012.

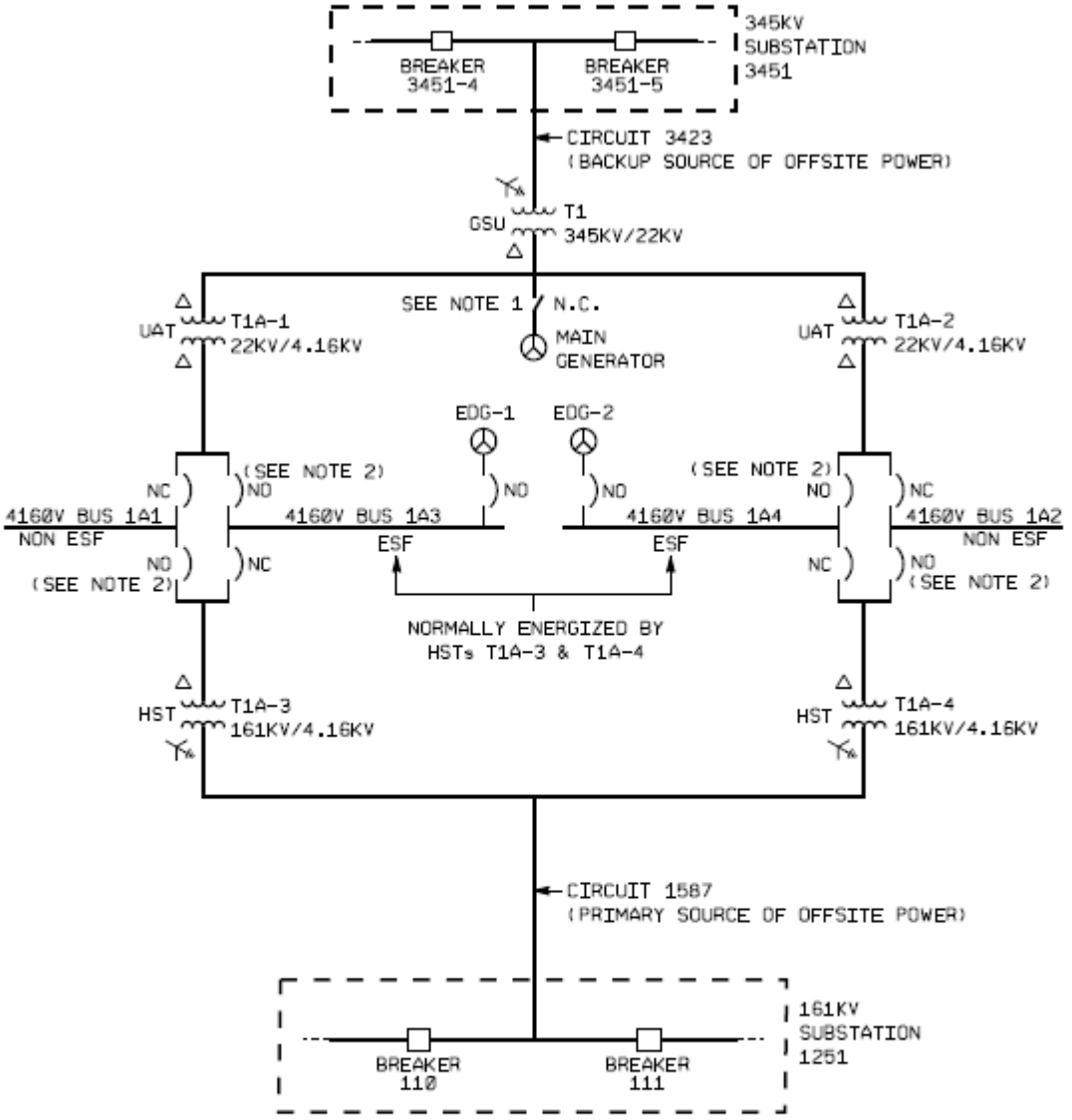
3.21 October 6, 2010 Public Meeting Presentation “Generic Issue 199: Implications of Updated Probabilistic Seismic Hazard Estimates in the Central and Eastern United States on Existing Plants – Safety/Risk Assessment,” USNRC (ML102770655)

3.22 Regulatory Guide 1.174, An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis, Revision 1 – November 2002

3.23 OPPD Letter LIC-13-0142, Probabilistic Risk Assessment (PRA) RAI Responses – NFPA 805 Transition (ME7244), Dated October 11, 2013

3.24 Letter from OPPD (T. L. Patterson) to NRC (Document Control Desk), Phase II Response to Generic Letter 88-20, Supplement 4 Individual Plant Examination of External Events (IPEEE), dated June 30, 1995 (LIC-95-0130), Enclosure, Section 3.1.5, Analysis of Containment Performance

# Figure 1




NOTE 1: THE MAIN GENERATOR DISCONNECT CAN BE MANUALLY OPENED AFTER A PLANT TRIP TO PERMIT BACKFEED.

NOTE 2: 4160V BUSES HAVE FAST TRANSFER CAPABILITY WHEN THE PREFERRED SOURCE OF POWER IS LOST.

FORT CALHOUN STATION
SIMPLIFIED
ONE-LINE DIAGRAM

**SUMMARY OF REGULATORY COMMITMENTS**

The following table identifies commitments made in this document. (Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.)

| COMMITMENT | COMMITTED DATE OR "OUTAGE" | COMMITMENT TYPE | |
|---|---|---|---|
| | | ONE-TIME ACTION (Yes/No) | Programmatic (Yes/No) |
| Room 71 administrative controls Implemented to limit risk to an acceptable level without the originally proposed High Energy Arc Fault (HEAF) barriers. | OUTAGE FCR 28 | No | Yes |
| To ensure consistency between the existing administrative controls for Condensate Storage Tank (CST) level and the control room CST low level alarm, the low level CST setpoint for the alarm will be revised to 80% from the current value of 50%. | OUTAGE FCR 28 | Yes | No |
| Administrative controls will be developed to require compensatory measures if the inventory in the CST drops below 80%. | OUTAGE FCR 28 | No | Yes |