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Joseph M. Farley Nuclear Plant – Units 1 and 2  
Response to Request for Information Regarding License Amendment Request to Revise the  
Actions of Technical Specification 3.8.9, "Distribution Systems – Operating"

Ladies and Gentlemen:

By letter dated October 11, 2016, Southern Nuclear Operating Company (SNC) submitted a license amendment request to revise the Technical Specifications (TSs) for the Joseph M. Farley Nuclear Plant, Units 1 and 2.

The proposed changes would add new Action Conditions (A, B, and C) to TS 3.8.9, "Distribution Systems - Operating" that address inoperable 600 Volt alternating current (AC) load center (LC) 1-2R. The proposed changes include Required Actions and associated Completion Times for the LC 1-2R.

By letter dated April 17, 2017, the Nuclear Regulatory Commission (NRC) staff requested additional information to complete its review. The Enclosure provides the SNC response to the NRC request.

This letter contains no NRC commitments. If you have any questions, please contact Ken McElroy at 205.992.7369.

Mr. J. J. Hutto states he is Regulatory Affairs Director for Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and, to the best of his knowledge and belief, the facts set forth in this letter are true.

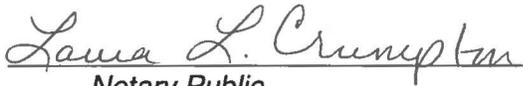
Respectfully submitted,



J. J. Hutto  
Regulatory Affairs Director

JJH/RMJ

Sworn to and subscribed before me this 15 day of May, 2017.

  
Notary Public

My commission expires: 10-8-2017

Enclosure: SNC Response to NRC Request for Additional Information

cc: Regional Administrator, Region II  
NRR Project Manager – Farley  
Senior Resident Inspector – Farley  
Director, Alabama Office of Radiation Control  
RTYPE: CFA04.054



**Joseph M. Farley Nuclear Plant – Units 1 and 2  
Response to Request for Information Regarding License Amendment Request to Revise  
the Actions of Technical Specification 3.8.9, “Distribution Systems – Operating”**

**Enclosure**

**SNC Response to NRC Request for Additional Information**

**Request for Additional Information (RAI) No. 1**

Regulatory Basis

FNP General Design Criteria, Criterion 17, "Electric Power Systems", states, in part:

An onsite electric power system and an offsite electric power system are provided to permit functioning of structures, systems, and components important to safety. The safety function for each system (assuming the other system is not functioning) provides sufficient capacity and capability to assure that specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences, and the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents.

The onsite electric power supplies, including the batteries, and the onsite electric distribution system, have sufficient independence, redundancy, and testability to perform their safety function assuming a single failure.

Provisions are included to minimize the probability of losing electric power from any of the remaining supplies as a result of, or coincident with, the loss of power generated by the nuclear power unit, the loss of power from the transmission network, or the loss of power from the onsite electric power supplies.

Issue

The licensee has stated on page E1-8 of the LAR:

In the event of a dual unit LOSP [loss of offsite power], this alignment (i.e., 1 C and 1-2A tied to the same unit) would leave the affected unit's (i.e. the unit unable to supply power to the LC 1-2R) A-train de-energized. This is the basis for the affected unit entering [Limiting Condition for Operation] (LCO) 3.8.1 for an inoperable diesel set, since the 1 C DG [diesel generator] may therefore be unavailable to align to the opposite unit as the 1-2A DG (i.e. the unit not experiencing the SI [safety injection]). Consistent with the definition of OPERABILITY, the 1C DG must be declared inoperable for the affected unit.

If the problem is a failed component i.e., DH08-2, or SSXFMR 2R or ER05 or SSCs downstream of the H bus, as shown in Enclosure 5 of the LAR as the cause of Proposed Condition A, then declaring the 1C DG inoperable and aligning the 1C DG selector switch to the non-affected unit appears to make the A-train electrical distribution not available in the affected unit.

Request

Would the issue described above be considered a reduction in plant safety? Also, considering the concerns described above, please justify Proposed Condition A or a TS modification.

**SNC Response to RAI No. 1**

Proposed Required Action A.1 (Align the 1C DG Unit Selector Switch to the non-affected unit) does not result in a reduction in plant safety. For the 1C DG to be operable, the load center (LC) 1-2R must be energized. As shown in the Figures provided in Enclosure 5 to the October 11, 2016 license amendment request (LAR), during a design basis dual unit loss of offsite power (LOSP) and single unit safety injection (SI) the 1-2A DG will energize 4160V F bus of the unit experiencing the SI, which will in turn energize that unit's 4160V K bus. That unit's 4160V H bus, however, will remain de-energized until manually energized by the operator. If the 1C DG aligns to the "affected unit" (the unit whose 4160V H bus is unable to supply power to the LC 1-2R), then LC 1-2R will not be able to be energized from either unit. Please consider the matrix below. The starting assumption is the 4160V bus 2H is unable to supply LC 1-2R due to work on breaker DH08-2 or ER05 and a dual unit LOSP occurs along with a single unit SI.

Scenario	1C DG Unit Selector Switch Aligned to Unit 1? (Yes/No)	Unit Experiencing the SI	DG Which Energizes the Listed Bus					
			1H	1K	1F	2H	2K	2F
1	Yes	Unit 1	1C	1-2A	1-2A	--	--	--
2	Yes	Unit 2	1C	1C	1C	--	1-2A	1-2A
3	No	Unit 1	--	1-2A	1-2A	1C*	1C*	1C*
4	No	Unit 2	1C	1C	1C	--	1-2A	1-2A

\*1C DG inoperable due to LC 1-2R being de-energized.

As can be seen above, if the SI occurs on the "affected" unit (the unit unable to supply power to the LC 1-2R, which in this example is Unit 2), the net result is the same regardless of whether the unit selector switch is aligned to the affected unit (Scenarios 2 and 4).

Comparing Scenarios 1 and 3, the key difference is that in Scenario 1 the LC 1-2R is energized and in Scenario 3 it is not. As was shown in Enclosure 4 to the LAR, the LC 1-2R supplies necessary louvers and fans for the 1C DG (along with other ancillary functions), as well as for the 1H and 2H buses. In Scenario 1, the LC 1-2R will continue to be able to supply its required loads (including the Unit 1 service water turbine building isolation valves V515 and V517). Scenario 1 is therefore preferred to Scenario 3 based on an increase in plant safety.

**RAI No. 2**

**Regulatory Basis**

FNP TS 1.1, "Definitions" state the definition for OPERABLE-OPERABILITY as:

A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).

Issue

When in CONDITION C of the proposed TS, Load Center 1-2R will be unable to supply power to any of its loads, including Switchgear Room A fans and louver damper motors and heaters. Loss of ventilation/heating in Switchgear Room A could affect the function of the 1H and 2H busses and their ability to perform their support function, which in turn affect the long term safety function and OPERABILITY of the 1F, 2F, 1K and 2K busses.

Request

Considering the mission time of the 1F, 2F, 1K and 2K busses in mitigating a design basis accident (DBA) and with design basis weather conditions, discuss the effect of the loss of ventilation in Switchgear Room A, on the long term function of the 1H and 2H busses and their ability to perform support functions for the Class 1E K and F buses in order for these buses to remain operable throughout their mission time as the buses power safety related loads during a DBA. Please include a discussion regarding how long until the associated electrical busses would be unable to perform their safety function and the basis for such determination. Please identify the affected TS and the associated required actions of the TS and identify any compensatory actions.

**SNC Response to RAI No. 2**

When offsite power is supplying the electrical train A loads or when the 1-2A DG is supplying the electrical train A loads, both the 1(2)K and the 1(2)H buses are supplied power from the 1(2)F bus. Therefore, in this situation, the 1H and 2H buses have no effect on the OPERABILITY of the 1F, 2F, 1K and 2K buses. The only time the 1(2)K or 1(2)F buses are supplied power from the 1(2)H bus is when the 1C DG is aligned to this H bus. Since the LC 1-2R is necessary to provide ventilation and heating to the 1C DG, the 1C DG is inoperable while in Condition C. The 1(2)H bus would therefore be unable to supply the 1(2)K or 1(2)F in this situation regardless of the ventilation or heating in switchgear room A. This is the reason the 1H and 2H buses are treated as a DG 1C support system for LCO 3.8.1 and LCO 3.8.2, and why these buses aren't listed as required 4160V buses in LCO 3.8.9. The proposed Required Actions have the 1C DG declared inoperable immediately. This is an exception to LCO 3.0.6, which states: "When a support system's Required Action directs a supported system to be declared inoperable or directs entry into Conditions and Required Actions for a supported system, the applicable Conditions and Required Actions shall be entered in accordance with LCO 3.0.2."

Since the 1C DG is declared inoperable, per LCO 3.0.6 the Conditions and Required Actions of the 1C DG supported systems are not entered unless a loss of safety function is determined to exist per the Safety Function Determination Program (TS 5.5.15). In this case, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exist are required to be entered. Similarly, TS 3.8.1 Required Action B.2 states to declare the required features supported by the inoperable DG set inoperable when its required redundant feature(s) is inoperable.

### **RAI No. 3**

#### **Regulatory Basis**

Title 10 of the *Code of Federal Regulations* (10 CFR) 50.36(c)(2)(i), states, in part:

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.

#### **Issue**

The licensee's proposed Required Action A.1 states, "Align 1C DG Unit Selector Switch to non-affected unit." Proposed Condition B is for when Condition A is not met.

#### **Request**

Describe any situations when the licensee would choose not to perform Required Action A.1 and provided a justification for each situation where Condition B is entered without entry into Required Action A.1 or A.2.

### **SNC Response to RAI No. 3**

FNP's preference will always be to remain in Condition A and not enter Condition B. Please note that while in Condition B, the Required Actions from Condition A (specifically to declare the 1C DG inoperable for the affected unit) still apply. The only reason FNP would enter Condition B would be if the operators felt the unit selector switch was unable to perform its function for any reason.

### **RAI No. 4**

Page E1-3 of the LAR in the paragraph beginning with "TS 3.8.9 ..." states that the "... unit(s) must be in MODE 3 in 6 hours and in MODE 5 within 36 hours." This appears to be in error as the current TS Condition D (TS page 3.8.9-2) requires MODE 4 as the end state (Amendment 202 and 198 for Units 1 and 2, respectively) for Conditions A, B, and not met. Please clarify the apparent error.

### **SNC Response to RAI No. 4**

A few months before this LAR was submitted, the NRC issued Amendments 202 and 198 for Units 1 and 2, respectively. This statement on page E1-3 was inadvertently not updated to reflect this latest Amendment. Based on Amendments 202 and 198, the requirements are to be in MODE 3 in 6 hours and MODE 4 in 12 hours if the 8-hour completion time for Condition A is not met.

## **RAI No. 5**

### **Regulatory Basis**

FNP General Design Criteria, Criterion 17, "Electric Power Systems" as described in RAI No. 1.

### **Issue**

In the LAR, Section 2.0, the licensee states that the TS Bases Table B 3.8.9-1 lists the LC 1- 2R as one of the required LCs to meet the LCO 3.8.9. This LC is considered shared equipment since it supplies power to loads that affect both units and it also receives power from either units' 4160V bus H (1H and 2H). Therefore, whenever this LC is inoperable, both Unit 1 and Unit 2 must enter current LCO 3.8.9 Condition A if they are in a Mode of applicability (MODES 1 - 4).

The proposed CONDITION A, Required Action A.1 requires alignment of the 1C DG selector switch using operator actions in the main control room. FNP Load Diagram, drawing D-173096, shows the Auto Transfer Device (ATD) connecting to both power sources which are independent and redundant from the 1H and 2H buses feeding LC 1-2R. In the proposed CONDITION A, LC 1-2R is inoperable due to power supply being unavailable either from buses 1H or 2H. In the LAR, the licensee did not appear to address the design features and capability of ATD to switch from one source to alternate source for the proposed CONDITION A, Required Action A.1.

### **Request**

- a. The proposed Required Action A.1 states "align 1C DG Unit Selector Switch to non-affected Unit." Explain why Action A.1 is required since ATD will transfer from normal source (affected Unit) to alternate source (non-affected Unit) or vice versa without manual operation. Please explain the terms "affected Unit" and "non-affected Unit" and the scenarios assumed.

### **SNC Response to RAI No.5.a**

The "affected Unit" for Condition A is the unit whose 4160V H bus is unable to supply power to the LC 1-2R. As mentioned in this NRC request, the LC 1-2R ATD will automatically align to the other unit's 4160V H bus if it loses power from the 4160V H bus from which it's being supplied. However, as shown in Scenario 3 of the SNC Response to RAI No. 1, not aligning the DG 1C unit selector switch to the non-affected unit (the 4160V H bus still able to supply power to the LC 1-2R) could result in neither unit's H bus being able to supply power to the LC 1-2R. Therefore, Required Action A.1 will ensure one of the two units' H bus will remain energized (through an OPERABLE DG 1C) such that the ATD will be able to have a source to seek.

- b. The current TS 3.8.9, "Distribution Systems – Operating," Condition A, allows 8 hours to restore the inoperable Alternate Current (AC) electrical power distribution system(s) to OPERABLE status. Since the ATD allows auto transfer to the available power source (alternate), explain why the 8 hours Completion Time (CT) LCO is not adequate to restore the inoperable AC electrical power distribution system(s) to OPERABLE status.

**SNC Response to RAI No. 5.b**

While the ATD allows auto transfer to the available power source, there are numerous reasons why the current 8 hour CT may not be adequate to restore an inoperable LC 1-2R to OPERABLE status. For example, during preventative maintenance (PM) activities, an unplanned discovery may require additional corrective maintenance that challenges the existing 8 hour CT. As discussed further in the SNC response to NRC RAI 5.d. there are various PM activities that must be performed on the LC 1-2R that requires it to be declared inoperable. The current TS requires at least one unit to enter the 8-hour required action statement for this PM (assuming the second unit is in a refueling outage). While FNP has historically been able to perform maintenance on this LC without requiring a dual-unit shutdown, the short CT still unnecessarily challenges the organization based on the insignificance of loads provided by this LC.

- c. If the ATD fails to transfer from its position, how this failure will affect the proposed TS changes. What will be the CT for restoring the ATD to operable status?

**SNC Response to RAI No. 5.c**

For the proposed TS change, if the ATD is unable to perform its function, then the 1C DG unit selector switch would be aligned to the unit currently supplying the LC 1-2R per Required Action A.1, since one unit would be unable to provide power to LC 1-2R. The CT to restore the ATD to OPERABLE status would therefore be consistent with the CT for restoring the 1C DG to OPERABLE status.

- d. In the FNP LAR, the licensee explained that current TS 3.8.9, Condition A has a CT of 8 hours for the inoperable LC 1-2R, which would appear to indicate a dual unit shutdown is required after the expiration of the 8 hour CT because LC 1-2R is shared between both units. In addition, the CT limits the extent of maintenance that could be performed. The licensee also explained that the new proposed Conditions (A, B, and C) to TS 3.8.9, "Distribution System – Operating," would reduce the likelihood of an unnecessary dual-unit TS required shutdown while also providing more flexibility for maintenance activities. Please provide details of all maintenance to be performed on the LC 1-2R including their frequencies. Also, provide plant specific operating experience that required LC 1-2R to be declared inoperable (failure of both sources or equipment).

**SNC Response to RAI No. 5.d**

The table below lists preventative maintenance (including surveillances) performed that may require entry into Condition A of LCO 3.8.9 based on the LC 1-2R being inoperable.

Maintenance	Frequency
1-2R LC Heat Detector PM	5 years
1-2R LC Cleaning	12 years
ER05 Breaker PM *	6 years
ER02 Breaker PM *	6 years
DH08-1 Breaker PM **	6 years
DH08-2 Breaker PM **	6 years

\* Dependent on breaker cell switch

\*\* Dependent on alignment of 1C DG

A review of recent maintenance shows the time for which the LC 1-2R was declared inoperable ranged from very short durations (less than an hour) to nearly five hours.

While there are no recent instances of the LC 1-2R initially being declared inoperable for reasons unrelated to maintenance, there have been issues that have surfaced during maintenance. For example, during maintenance performed on a Unit 2 supply breaker during the spring 2016 Unit 2 refueling outage, the Unit 1 supply breaker tripped open when control power fuses were restored and would not reclose. This condition was not immediately discovered, and was documented in licensee event report (LER) 2016-001-00.

Although PM affecting the LC 1-2R has not caused any required plant shutdowns to date, the short CT still places undue stress that's not commensurate with the safety significance of this LC. In addition, the proposed changes could allow maintenance of the H buses and supply breakers to be performed with the units on-line. This is preferable from a safety-standpoint versus performing during a refueling outage, as it allows for more focus to be placed on the maintenance activity without the distractions associated with the refueling outage.

### **RAI No. 6**

#### **Regulatory Basis**

50.36(c)(2)(i) as described in RAI No. 3.

#### **Issue**

FSAR Section 8.3.1.1.7.2 states that DGs 1-2A and 1C are dedicated to train A, but there are no Design-Basis Events (DBEs) in which DG 1-2A or 1C supplies power to safety loads of both units simultaneously. The Unit 1 and Unit 2 breakers for each of these two diesels are interlocked so as to prevent the diesels from being connected to both units at the same time; therefore, DGs 1-2A and 1C are characterized as "shared" only from the point of view of their capability to align to either Unit 1 or Unit 2.

#### **Request**

Assuming the proposed TS 3.8.9, Condition A, Required Action A.1 is completed, as stated, then the affected Unit will have one diesel (i.e., Set B DG. In Condition A, Required Action A.1, DG 1C will be aligned to the non-affected Unit and DG 1-2A will be aligned to the affected Unit). Subsequently, if a DBE (Loss Of Offsite Power (LOSP)/Loss-Of-Coolant Accident (LOCA) or LOSP) occurs in the non-affected Unit, then as per the design 1-2A DG should align with the non-affected Unit. Then both 1C and 1-2A DGs are aligned with the non-affected Unit. What actions will be taken under this scenario? In this case, explain how this requested TS change meet the design basis as specified in accident analysis. In addition, explain the plant response, if a DBE such as LOSP or LOSP/LOCA coincident with a single failure (e.g., loss of Set B DG) occurs on the non-affected Unit.

### **SNC Response to RAI No. 6**

As stated, in the situation described above, proposed Condition A could result in both the DG 1C and DG 1-2A both being aligned to the same unit (the non-affected unit). The limiting condition for operation (LCO) for that unit would be fully met. As stated in the LAR, the logic associated with the tie breaker between F and H busses (DF13) will ensure that 1C DG and 1-2A DG are never paralleled (i.e., if 1C DG were selected to the unit to which the 1-2A ties, DF13 will remain open while 1C DG energizes the H bus (which in turn energizes the 1-2R LC) while 1-2A DG energizes the F and K bus. The non-affected unit (whose LCO is fully met) will still be able to meet the design basis of the unit assuming a worst-case single failure (e.g. failure of the 1-2A, 1C, or the 1(2)B DG) because it will have both the train A and train B DGs OPERABLE. All this would happen automatically, with no additional operator action.

As discussed previously, the affected unit enters the ACTION statement for an inoperable DG 1C. While in a TS Action statement (an LCO not met), it is recognized that the plant is not single failure proof, which is why the Required Action specifies a time limit in which the LCO must be met. Per GL 80-30 (with underline added for effect):

"The NRC's Standard Technical Specifications (STS) were formulated to preserve the single failure criterion for systems that are relied upon in the safety analysis report. By and large, the single failure criterion is preserved by specifying Limiting Conditions for Operation (LCOs) that require all redundant components of safety related systems to be OPERABLE. When the required redundancy is not maintained, either due to equipment failure or maintenance outage, action is required, within a specified time, to change the operating mode of the plant to place it in a safe condition. The specified time to take action, usually called the equipment out of service time, is a temporary relaxation of the single failure criterion, which, consistent with overall system reliability considerations, provides a limited time to fix equipment or otherwise make it OPERABLE. If equipment can be returned to OPERABLE status within the specified time, plant shutdown is not required."

Although assuming an additional single failure while in ACTION statement is beyond the plant's design basis, FNP also has a station blackout (SBO) DG 2C. This DG is 2850-kW, and is dedicated to SBO events. DG 2C meets all applicable safety-related criteria and thus, it is available for use on either the Unit 1 or Unit 2 load group B-train during design basis events.

### **RAI No. 7**

#### Regulatory Basis

FNP TS 1.1 defines OPERABLE-OPERABILITY as described in RAI No. 2.

#### Issue

The proposed TS 3.8.9 Condition A, Required Action A.2 requires to declare DG 1C as inoperable for the affected Unit. Proposed Required Action A.2 would limit operation to 10 days for the affected unit. Also, if the affected unit's DG Set B were to become inoperable during this condition, TS 3.8.1 Condition E would be entered for two DG sets being inoperable.

Request

Since DG 1C is shared between the Units and the proposed change requires the DG 1C to be declared inoperable even for inoperability resulting from other components on the power paths to maintain power availability to LC 1-2R, provide technical and regulatory basis demonstrating the proposed action is conservative in maintaining plant safety.

**SNC Response to RAI No. 7**

As previously discussed, LC 1-2R is required for operability of the DG 1C based on supporting required fans, louvers, and other environmental equipment. The definition of OPERABILITY requires that "all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s)." Therefore, it is appropriate to declare the DG 1C inoperable if the LC 1-2R is inoperable. The fact that a particular LCO Condition or Conditions are being entered does not alter the response of the DGs to a design basis event, beyond the effect of the inoperable component.