

March 22, 2017

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50-364

NL-16-2384

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

Joseph M. Farley Nuclear Plant Units 1 & 2  
Non-Voluntary License Amendment Request to Correct  
Non-Conservative Technical Specification 3.7.1

Ladies and Gentlemen:

In accordance with the requirements of 10 CFR 50.90, Southern Nuclear Operating Company (SNC) hereby requests an amendment to the Joseph M. Farley Nuclear Plant (FNP), Unit 1 Renewed Operating License NPF-2, and Unit 2 Renewed Operating License NPF-8. Specifically, this change is requested for a Non-Conservative Technical Specification (TS) 3.7.1, "Main Steam Safety Valves (MSSVs)," as described in the Enclosures to this letter.

Revision of the TS 3.7.1, MSSVs, is needed to resolve a non-conservative moderator temperature coefficient (MTC) value. Enclosure 1 provides the basis for the proposed changes, Enclosure 2 provides the marked-up TS 3.7.1 pages (along with unaffected pages included for context) and Enclosure 3 provides the clean-typed TS 3.7.1 pages. Enclosure 4 provides marked-up pages showing associated changes planned for the TS 3.7.1 Bases (along with unaffected pages included for context).

SNC requests approval of the proposed license amendment by March 31, 2018. The proposed changes will be implemented within 90 days of issuance of the amendment.

In accordance with the requirements of § 50.91(b)(1), "State Consultation," a copy of this request and its analysis regarding no significant hazards considerations is being provided to the designated Alabama official.

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.

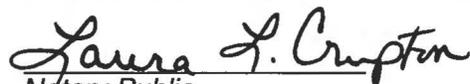
Respectfully submitted,



J. J. Hutto  
Regulatory Affairs Director



Sworn to and subscribed before me this 22 day of March, 2017.

  
Notary Public

My commission expires: 10-8-2017

JJH/PDB/lac

- Enclosures: 1. Description and Evaluation of Change  
2. FNP Units 1 and 2 Technical Specification 3.7.1 Marked-Up Pages  
3. FNP Units 1 and 2 Technical Specification 3.7.1 Clean Typed Pages  
4. FNP Units 1 and 2 Technical Specification 3.7.1 Bases Marked-Up Pages  
(Information only)

cc: Southern Nuclear Operating Company  
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David Walter, Director, Alabama Office of Radiation Control

**Joseph M. Farley Nuclear Plant Unit 1 and 2  
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**Enclosure 1**

**Description and Evaluation of Change**

**Enclosure 1**  
**Description and Evaluation of Change**

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## 1.0 SUMMARY DESCRIPTION

Southern Nuclear Operating Company (SNC) is submitting this License Amendment Request for the Renewed Facility Operating Licenses of Joseph M. Farley Nuclear Plant (FNP) Unit 1 (NPF-2) and Unit 2 (NPF-8). Specifically, SNC requests the Nuclear Regulatory Commission's (NRC) review and approval of the revision to Condition A and Condition B of Technical Specification (TS) 3.7.1, Main Steam Safety Valves (MSSVs), in order to replace the existing values for moderator temperature coefficient (MTC). These values have been determined to be non-conservative and inconsistent with the licensing basis and TS Bases for FNP.

## 2.0 DETAILED DESCRIPTION

The MTC values for TS 3.7.1 Condition A and B are not consistent with the associated TS Bases and Loss of Load/Turbine Trip (LOL/TT) safety analysis. The current TS 3.7.1 Condition A states, "One or more steam generators with one MSSV inoperable and the moderator temperature coefficient (MTC) zero or negative at all power levels." The corresponding Required Action A.1 states "reduce THERMAL POWER to  $\leq 87\%$  RTP". Condition B states "One or more steam generators with two or more MSSVs inoperable **OR** One or more steam generators with one MSSV inoperable and the MTC positive at any power level." The corresponding Required Action B.1 states "Reduce THERMAL POWER to less than or equal to the Maximum Allowable % RTP specified in Table 3.7.1-1 for the number of OPERABLE MSSVs." Therefore, for one inoperable MSSV, power is reduced to 60% rated thermal power (RTP).

As reflected in LOL/TT safety analysis, TS 3.7.1 Bases states, in part, "The middle-of-life analysis assumes a  $-10$  pcm/ $^{\circ}$ F MTC and demonstrates that the maximum allowable power level associated with one inoperable MSSV per steam generator can be relaxed to 87% RTP when core average burnup is  $\geq 14,000$  MWD/MTU." A power reduction to 87%, rather than 60%, when MTC is less than zero but greater than  $-10$  pcm/ $^{\circ}$ F is not supported by the TS Bases and LOL/TT safety analysis calculations. This band, with MTC between zero and  $-10$  pcm/ $^{\circ}$ F, correlates to a cycle burnup of  $< 14,000$  MWD/MTU, and should require a power reduction to 60% rather than allowing power to be reduced to 87%. Specifically, the current TS would result in a non-conservative condition post-accident when the plant was operating prior to middle-of-life (cycle burnup  $< 14,000$  MWD/MTU) where MTC would be less negative than the analyzed  $-10$  pcm/ $^{\circ}$ F value that corresponds to the relaxed 87% RTP.

This discrepancy was entered into the corrective action program, and a past operability review was conducted by reviewing narrative logs for the past three (3) years. During that timeframe, TS 3.7.1 Condition A was only entered once when burnup records indicated 21,092.66 MWD/MTU, and the MTC value was more negative than  $-10$  pcm/ $^{\circ}$ F. The burnup at which the MTC becomes more negative than  $-10$  pcm/ $^{\circ}$ F is confirmed to occur each cycle prior to 14,000 MWD/MTU cycle burnup per the Westinghouse reload safety analysis checklist. A standing order was issued by Operations to compensate for the currently written, non-conservative TS Condition A. The standing order requires operators to reduce power to 60%, when cycle burnup is  $< 14,000$  MWD/MTU to ensure the actions are consistent with the current TS Bases and LOL/TT safety analysis.

The error introducing the incorrect MTC value was executed during the Improved Technical Specification (ITS) conversion. SNC is requesting to revert Conditions A and B back to the approved value used prior the ITS conversion, which specified actions based on cycle burnup. The ITS conversion documents for FNP can be found at Assession number 9803190041 and

ML993250189. Original NRC approval of the TS set point values, prior to ITS conversion, is included in the safety evaluation dated September 3, 1996. This evaluation approved the use of the modified set points, the percent of RTP values provided in Table 3.7-1, and the formerly associated footnote which allowed a power reduction to 87% for cycle burnup  $\geq 14,000$  MWD/MTU.

Additionally, the TS bases wording has also been identified as requiring clarification. The term "core average burnup" will be replaced with "cycle burnup" in all instances, which is consistent with the safety analysis calculations.

### **3.0 TECHNICAL EVALUATION**

#### **3.1 System Description**

Overpressure protection for each unit's three steam generators is provided by the MSSVs. The design basis for the MSSVs is that they must have sufficient capacity so that main steam pressure does not exceed 110% of the steam generator shell-side design pressure.

Due to the large mass flowrate, each steam generator is protected by a number of valves. The maximum actual capacity of a single valve fully open at 1085 psig does not exceed 890,000 lbm/h. This provision serves to limit steam release if any one valve inadvertently sticks open.

The MSSVs are located on the main steam lines outside the containment and upstream of the main steam isolation valves. Each of the three main steam lines is equipped with five safety valves. To prevent chattering during operation of the safety valves, each of the five valves on a steam line is set at a different set pressure. The first valve is set to a pressure of 1075 psig, which corresponds to the steam generator shell design pressure minus the pressure loss from the steam generator to the valve. Each of the remaining valves is set at a higher pressure set point such that all valves are open and at full relief flow without exceeding 110% of the steam generator shell design pressure.

#### **3.2 Basis for Proposed Change**

Considering that the maximum allowable power levels specified in TS Table 3.7.1-1 are overly conservative when applied to middle and end-of-life conditions, the FNP safety design basis included an analysis for middle-of-life MTC conditions with one inoperable MSSV per steam generator. In this case, no reduction in the Power Range Neutron Flux-High trip set point is required, but the reactor power must still be reduced. The middle-of-life analysis assumes a -10 pcm/ $^{\circ}$ F MTC and demonstrates that the maximum allowable power level associated with one inoperable MSSV per steam generator can be relaxed to 87% RTP when the cycle burnup is  $\geq 14,000$  MWD/MTU. As previously stated, the MTC value at 14,000 MWD/MTU is verified to be more negative than -10 pcm/ $^{\circ}$ F for each reload cycle.

### **4.0 REGULATORY ANALYSIS**

#### **4.1 Applicable Regulatory Requirements/Criteria**

Title 10 Code of Federal Regulations (10 CFR) 50.36(c)(2)

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 TS until the condition can be met.

#### 4.2 No Significant Hazards Consideration Determination

In accordance with the requirements of 10 CFR 50.90, Southern Nuclear Operating Company (SNC), requests an amendment to the Technical Specifications (TS) for Joseph M. Farley Nuclear Plant (FNP), Unit 1 Renewed Operating License NPF-2, and Unit 2 Renewed Operating License NPF-8. Specifically, this change is requested to correct a Non-Conservative Technical Specification (TS) 3.7.1, "Main Steam Safety Valves" (MSSVs).

SNC has evaluated the proposed amendment against the standards in 10 CFR 50.92 and has determined that the operation of FNP in accordance with the proposed amendment presents no significant hazards. SNC's evaluation against each of the criteria in 10 CFR 50.92 is as follows.

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

Response: No

The proposed change revises the TS for the purpose of correcting a non-conservative value. The proposed TS change does not introduce new equipment or new equipment operating modes, nor does the proposed change alter existing system relationships. The proposed change does not affect normal plant operation. Further, the proposed change does not increase the likelihood of the malfunction of any system, structure, or component, or negatively impact any analyzed accident. This change corrects the TS to ensure all associated accident analyses are adequately considered. The probability of an accident previously evaluated is not affected and there is no significant increase in the consequences of any accident previously evaluated. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

Response: No

The proposed change revises the TS for the purpose of correcting a non-conservative value. The change does not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed) or a change in the methods governing normal plant operations. The proposed change does not alter assumptions made in the safety analysis. Further, the proposed change does not introduce new accident initiators. 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 change involve a significant reduction a margin of safety?

Response: No

The proposed change revises the TS for the purpose of correcting a non-conservative value. The proposed change does not alter the manner in which safety limits, limiting safety system

Enclosure 1 to NL-16-2384  
Description and Evaluation of Change

settings, or limiting conditions for operation are determined. The safety analysis assumptions and acceptance criteria are not affected by this change. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above evaluation, SNC concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of "no significant hazards consideration" is justified.

#### **4.3 Regulatory 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**

Southern Nuclear has evaluated the proposed amendment to change the FNP TS and determined that the amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed amendment is not required.

#### **6.0 REFERENCES**

1. Proposed Marked Up Pages for Conversion to Improved Technical Specification, March 12, 1998 ADAMS Assession No. 9803190041.
2. Amendment to Improved Technical Specifications for Joseph M. Farley Nuclear Plant Conversion, October 18, 1999. ADAMs Assession No. ML993250189.
3. Issuance of Amendments - Joseph M. Farley Nuclear Plant, Units I And 2 (Tac Nos. M95700 And M95701), September 3, 1996 ADAMs Assession No. 9609090289

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**Enclosure 2**

**FNP Units 1 and 2 Technical Specification 3.7.1 Marked-Up Pages**

3.7 PLANT SYSTEMS

3.7.1 Main Steam Safety Valves (MSSVs)

LCO 3.7.1 Five MSSVs per steam generator shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

-----NOTE-----  
Separate Condition entry is allowed for each MSSV.  
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CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One or more steam generators with one MSSV inoperable and the Moderator Temperature Coefficient (MTC) zero or negative at all power levels.</p>	<p>A.1 Reduce THERMAL POWER to <math>\leq</math> 87% RTP.</p>	<p>4 hours</p>
<p>B. One or more steam generators with two or more MSSVs inoperable.</p> <p><u>OR</u></p> <p>One or more steam generators with one MSSV inoperable and the MTC positive at any power level.</p>	<p>B.1 Reduce THERMAL POWER to less than or equal to the Maximum Allowable % RTP specified in Table 3.7.1-1 for the number of OPERABLE MSSVs.</p> <p><u>AND</u></p>	<p>4 hours</p>

Cycle burnup  $\geq$  14,000 MWD/MTU.



Cycle burnup < 14,000 MWD/MTU.



(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	<p>B.2 -----NOTE----- Only required in MODE 1. -----</p> <p>Reduce the Power Range Neutron Flux-High reactor trip setpoint to less than or equal to the Maximum Allowable % RTP specified in Table 3.7.1-1 for the number of OPERABLE MSSVs.</p>	36 hours
<p>C. Required Action and associated Completion Time not met.</p> <p><u>OR</u></p> <p>One or more steam generators with <math>\geq 4</math> MSSVs inoperable.</p>	<p>C.1 Be in MODE 3.</p> <p><u>AND</u></p>	6 hours
	<p>C.2 Be in MODE 4.</p>	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.7.1.1 -----NOTE----- Only required to be performed in MODES 1 and 2. -----</p> <p>Verify each required MSSV lift setpoint per Table 3.7.1-2 in accordance with the Inservice Testing Program. Following testing, lift setting shall be within <math>\pm 1\%</math>.</p>	In accordance with the Inservice Testing Program

Table 3.7.1-1 (page 1 of 1)  
OPERABLE Main Steam Safety Valves versus  
Maximum Allowable Power

NUMBER OF OPERABLE MSSVs PER STEAM GENERATOR	MAXIMUM ALLOWABLE POWER (% RTP)
4	60
3	43
2	24

**Joseph M. Farley Nuclear Plant Unit 1 and 2  
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**Enclosure 3**

**FNP Units 1 and 2 Technical Specification 3.7.1 Clean Typed Pages**



**Joseph M. Farley Nuclear Plant Unit 1 and 2  
Non-Voluntary License Amendment Request to Correct  
Non-Conservative Technical Specification 3.7.1**

**Enclosure 4**

**FNP Units 1 and 2 Technical Specification 3.7.1 Bases Marked-Up Pages  
(Information Only)**

BASES

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APPLICABLE  
SAFETY ANALYSES  
(continued)

MSSVs on the same steam generator it is necessary to prevent this power increase by lowering the Power Range Neutron Flux-High setpoint to an appropriate value. When the Moderator Temperature Coefficient (MTC) is positive, the reactor power may increase above the initial value during an RCS heatup event (e.g., turbine trip). Thus, for any number of inoperable MSSVs it is necessary to reduce the trip setpoint if a positive MTC may exist at partial power conditions, unless it is demonstrated by analysis that a specified reactor power reduction alone is sufficient to prevent overpressurization of the steam system.

The maximum allowable power levels specified in Table 3.7.1-1 are overly conservative at middle and end-of-life conditions, when the MTC is not positive. Therefore, a specific analysis which credits a middle-of-life MTC was performed to relax the power reduction associated with one inoperable MSSV per steam generator. In addition, for the above case, no reduction in the Power Range Neutron Flux-High trip setpoint is required. The middle-of-life analysis assumes a -10 pcm/degree F MTC and demonstrates that the maximum allowable power level associated with one inoperable MSSV per steam generator can be relaxed to 87% RTP when ~~core~~ average burnup is  $\geq 14,000$  MWD/MTU. The MTC value at 14,000 MWD/MTU is verified to be more negative than -10 pcm/degree F for each reload cycle.

cycle



The MSSVs are assumed to have two active and one passive failure modes. The active failure modes are spurious opening, and failure to reclose once opened. The passive failure mode is failure to open upon demand.

The MSSVs satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

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LCO

The accident analysis requires that five MSSVs per steam generator be OPERABLE to provide overpressure protection for design basis transients occurring at 102% RTP. The LCO requires that five MSSVs per steam generator be OPERABLE in compliance with Reference 2, and the DBA analysis.

The OPERABILITY of the MSSVs is defined as the ability to open upon demand within the setpoint tolerances, to relieve steam generator overpressure, and reseal when pressure has been reduced. The OPERABILITY of the MSSVs is determined by periodic surveillance testing in accordance with the Inservice Testing Program.

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