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SOUTHERN COMPANY
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December 7, 2007

Docket Nos.: 50-348
50-364

NL-07-2245

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

Joseph M. Farley Nuclear Plant - Units 1 and 2
Generic Letter 2004-02 Response Extension Request–Chemical Effects

Ladies and Gentlemen:

By letter dated August 31, 2005, Southern Nuclear Operating Company (SNC) submitted a combined SNC response for Joseph M. Farley Nuclear Plant (FNP) and Vogtle Electric Generating Plant (VEGP) on NRC Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors." In this letter, SNC committed to the installation of the FNP Unit 1 and Unit 2 new post-LOCA (Loss of Coolant Accident) containment sump recirculation screens, completion of required modifications, and implementation of required procedural changes by December 31, 2007.

By letter dated July 3, 2007, SNC requested the completion of the Unit 2 throttle valve modifications be extended until the completion of the Unit 2 fall 2008 refueling outage, scheduled to begin on October 11, 2008. By letter dated August 29, 2007, the NRC determined that it is acceptable to extend the completion date for the throttle valve modifications on Unit 2 until the completion of the Unit 2 fall 2008 refueling outage, scheduled to begin on October 11, 2008. Taking into account the issues discussed in this letter, the bases described in the July 3, 2007 SNC letter remains valid and current.

SNC is fully committed to resolving GSI-191. The following modifications have been implemented at FNP:

- FNP contracted with General Electric Company (GE) to provide sump strainers which have been installed on Unit 1 and Unit 2.

- Downstream effects evaluation resulted in modifications to the Safety Injection (SI) flow orifices and throttle valves. These modifications have been completed on Unit 1 and are scheduled for completion on Unit 2 in the fall of 2008.

However, in addition to the Unit 2 throttle valve modifications, the FNP passive screen design still has open industry issues to be resolved. The outstanding items are:

- Completion of the plant specific evaluation of chemical plateout in the core per WCAP-16793-NP, "Evaluation of Long-Term Cooling Considering Particulate, Fibrous and Chemical Debris in the Recirculating Fluid"

- Complete screen head loss chemical effects testing and evaluation of test results.

- Determine whether hardware and/or procedural modifications are needed as a result of the chemical effects testing/evaluation and modification implementation schedule, if required.

Considering the above, a short extension to the completion schedule is requested to extend the completion of the corrective actions required by Generic Letter 2004-02 for FNP Units 1 and 2 from December 31, 2007 to April 30, 2008. This would allow SNC time to receive the screen vendors test reports for chemical effects testing, complete the evaluation of the impact of chemical plateout on the core and determine if changes to the modification implementation schedule are required.

Enclosure 1 to this letter provides the basis for SNC's conclusion that it is acceptable to extend the completion of the corrective actions required by Generic Letter 2004-02, an update of on-going activities, and provides the basis for the extension request.

The NRC commitments contained in this letter are provided as a table in Enclosure 2. If you have any questions, please advise.

SNC requests approval of the proposed request by December 31, 2007.

(Oath and affirmation on the following page)

Mr. L. M. Stinson states he is a Vice President of 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,

SOUTHERN NUCLEAR OPERATING COMPANY

L. M. Stinson
Vice President Fleet Operations Support

Sworn to and subscribed before me this 7th *day of* December, *2007.*

Notary Public

My commission expires: July 5, 2010

LMS/CHM

Enclosures: 1. Basis for Proposed Extension Request
2. List of Regulatory Commitments

cc: Southern Nuclear Operating Company
Mr. J. T. Gasser, Executive Vice President
Mr. J.R. Johnson, Vice President – Farley
Mr. D. H. Jones, Vice President – Engineering
RType: CFA04.054; LC # 14693

U. S. Nuclear Regulatory Commission
Mr. Victor McCree, Acting Regional Administrator
Ms. K.R. Cotton, NRR Project Manager – Farley
Mr. E.L. Crowe, Senior Resident Inspector – Farley

State of Alabama
Dr. D.E. Williamson, State Health Officer

Joseph M. Farley Nuclear Plant - Units 1 and 2
Generic Letter 2004-02 Response Extension Request – Chemical Effects

Enclosure 1

Basis for Proposed Extension Request

Joseph M. Farley Nuclear Plant - Units 1 and 2
Generic Letter 2004-02 Response Extension Request – Chemical Effects

Enclosure 1

Basis for Proposed Extension Request

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1.0 Background

By letter dated August 31, 2005, Southern Nuclear Operating Company (SNC) submitted a combined SNC response for Joseph M. Farley Nuclear Plant (FNP) and Vogtle Electric Generating Plant (VEGP) on NRC Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors." In this letter, SNC committed to the installation of the FNP Unit 1 and Unit 2 new post-LOCA (Loss of Coolant Accident) containment sump recirculation screens, completion of required modifications, and implementation of required procedural changes by December 31, 2007.

By letter dated July 3, 2007, SNC requested the completion of the Unit 2 throttle valve modifications be extended until the completion of the Unit 2 fall 2008 refueling outage, scheduled to begin on October 11, 2008. By letter dated August 29, 2007, the NRC determined that it is acceptable to extend the completion date for the throttle valve modifications on Unit 2 until the completion of the Unit 2 fall 2008 refueling outage, scheduled to begin on October 11, 2008. Taking into account the issues discussed in this letter, the bases described in the July 3, 2007 SNC letter remains valid and current.

SNC is fully committed to resolving GSI-191. The following modifications have been implemented at FNP:

- FNP contracted with General Electric Company (GE) to provide sump strainers which have been installed on Unit 1 and Unit 2.

- Downstream effects evaluation resulted in modifications to the Safety Injection (SI) flow orifices and throttle valves. These modifications have been completed on Unit 1 and are scheduled for completion on Unit 2 in the fall of 2008.

However, in addition to the Unit 2 throttle valve modifications, the FNP passive screen design still has open industry issues to be resolved. The outstanding items are:

- Completion of the plant specific evaluation of chemical plateout in the core per WCAP-16793-NP, "Evaluation of Long-Term Cooling Considering Particulate, Fibrous and Chemical Debris in the Recirculating Fluid"

- Complete screen head loss chemical effects testing and evaluation of test results.

- Determine whether hardware and/or procedural modifications are needed as a result of the chemical effects testing/evaluation and modification implementation schedule, if required.

Considering the above, a short extension to the completion schedule is requested to extend the completion of the corrective actions required by Generic Letter 2004-02 for FNP Units 1 and 2 from December 31, 2007 to April 30, 2008. This would allow SNC time to receive the screen vendors test reports for chemical effects testing, complete the evaluation of the impact of chemical plateout on the core and determine if changes to the modification implementation schedule are required.

2.0 Justification for Proposed Extension

FNP will not be in full compliance with GL 2004-02 by December 31, 2007 due to the open industry issues identified above. Justification of the requested extension is based on the following:

- The FNP containments are compartmentalized making transport of debris to the sump difficult.

- FNP does not require switchover to recirculation from the sump during a large-break loss-of-coolant accident (LOCA) until 20 to 35 minutes after accident initiation, allowing time for much of the debris to settle in other places within containment.

- Leak-before-break (LBB) qualified piping is of sufficient toughness that it will most likely leak (even under safe shutdown earthquake conditions) rather than rupture. The current issue regarding primary water stress corrosion cracking (PWSCC) associated with pressurizer Alloy 600/82/182 dissimilar metal welds was addressed during the Unit 2 spring 2007 refueling outage by inspection of six pressurizer nozzles and the use of weld overlay techniques on the pressurizer surge line nozzle. Additional mitigation by weld overlay techniques will be completed by the end of the Unit 2 spring refueling outage in 2010. Affected nozzles on the Unit 1 pressurizer have been addressed using weld overlay techniques.

- SNC installed debris interceptors in the containment which will limit the amount of debris that reaches the screens.

- For Unit 1 SNC has installed new flow orifices and throttle valves in the Safety Injection lines that result in the clearance through the throttle valves being greater than the hole size in the containment sump recirculation strainers. This modification is scheduled to be completed in the fall of 2008 on Unit 2.

Additional favorable design features and administrative controls are described in Section 4.2.1 Mitigative Measures below. These elements will remain valid during the extension period requested by this submittal.

3.0 Reason for the Request for Proposed Extension

FNP will not be in full compliance with GL 2004-02 by December 31, 2007 due to the open industry issues identified above. The following activities require completion to address GL 2004-02:

- Complete the plant-specific chemical plateout evaluation per WCAP-16793-NP.

  Per WCAP-16793-NP, reasonable assurance of long-term core cooling for all plants is demonstrated by the following:

  1. The size of holes in replacement sump screens designs limits the size of debris that is passed through the screen during operation of the ECCS in the recirculation mode.

  2. Based on available test observations, the characteristic dimension of this debris is typically less than the screen hole size, even for fibrous debris. Consequently, debris buildup at critical locations in the reactor vessel and core is not expected.

  3. Based on data presented internationally during the resolution of the BWR strainer performance concerns, fibrous debris was observed to not strongly adhere to fuel cladding. Thus, the small size of the debris and its tendency to not adhere to fuel indicates that long-term core cooling of the fuel will not be impaired by either the collection of fibrous and particulate debris in fuel elements, or by the collection of fibrous debris on fuel cladding surfaces.

  4. Supporting calculations have demonstrated long-term core cooling will be maintained with about 99.4% of the core blocked. The cladding temperature response to blockage at grids and the collection of precipitation on clad surfaces was also demonstrated to be acceptable with resulting cladding temperatures less than 400°F.

  5. A method to evaluate chemical effects on fuel has been developed, applied to several "worst case" plant chemistries and acceptable clad temperatures were calculated.

  The WCAP concludes that reasonable assurance of acceptable long-term core cooling with debris and chemical products in the recirculating fluid is demonstrated for all plants based on:

  ☐ Items 1 through and including 4, are directly applicable to all PWRs, and,

  ☐ Either a demonstration that the sample calculations identified in Item 5, above, bound the plant-specific chemistry, or the

completion of a plant-specific calculation using the method identified in Item 5, above.

SNC has not completed the plant-specific calculation using the method identified in Item 5, above.

- Complete chemical effects testing and evaluation of test results.
- Determine whether hardware and/or procedural modifications are needed as a result of the chemical effects testing/evaluation and modification implementation schedule, if required.

4.0 Compliance with SECY-06-0078 Criteria

SECY-06-0078, March 31, 2006, "Status of Resolution of GSI-191, "Assessment of [Effect of] Debris Accumulation on PWR Sump Performance," specifies two criteria for short duration GL 2004-02 extensions limited to several months. These first two criteria and SNC's responses are provided below.

4.1 Criterion No. 1:

The licensee has a plant-specific technical/experimental plan with milestones and schedule to address outstanding technical issues with enough margin to account for uncertainties.

SNC Response

SNC has established the following plan to address the outstanding issues. The design of the FNP replacement strainers provided for additional strainer surface area to account for chemical effects.

Issue	Completion Date
Complete the plant-specific chemical plateout evaluation per WCAP-16793-NP.	April 30, 2008
Complete chemical effects testing and evaluation of test results.	April 30, 2008

Issue	Completion Date
Determine whether hardware and/or procedural modifications are needed as a result of the chemical effects testing/evaluation and modification implementation schedule, if required.	April 30, 2008
Installation of the new Unit 2 ECCS throttle valves.	Fall 2008 outage (Note: The extension request for this activity was previously approved by the NRC in letter dated August 29, 2007.)

Based on the above discussion, SNC meets the requirements of SECY-06-0078 Criterion No. 1.

4.2 Criterion No. 2:

The licensee identifies mitigative measures to be put in place prior to December 31, 2007, and adequately describes how these mitigative measures will minimize the risk of degraded ECCS [emergency core cooling system] and CSS [containment spray system] functions during the extension period.

SNC Response

4.2.1 Mitigative Measures

The following mitigative measures have already been implemented to minimize the risk of degraded ECCS and CSS functions during the extension period.

- SNC has completed the installation of the new sump strainers on Units 1 and 2. These strainers have increased the available surface area to deal with debris in the recirculation water.

- Procedural guidance exists regarding containment foreign material exclusion (FME) controls. This helps ensure that the strainers are not subjected to undue loading from foreign material.

- Bulletin 2003-01 training and procedural guidance to expedite plant cooldown in response to a small break LOCA. This reduces the possibility of needing to go on emergency sump recirculation.

- Insulation inside containment that is affected during a LOCA event is mostly Reflective Metal Insulation (RMI) with very little fiber. Thus an FNP demand on the strainers is minimal.

- Application of the leak-before-break analysis principle has been approved by the NRC Staff for FNP in relation to breaks in the reactor coolant loop primary piping and pressurizer surge line piping. Thus the debris loading that SNC has assumed for the strainers is conservative.

- The design basis NPSH analysis for the Containment Spray (CS) System pumps and the Residual Heat Removal (RHR) pumps do not credit containment overpressure. Therefore the NPSH analyses for FNP are conservative and additional margin is available.

4.2.2 New Screen Installation

FNP contracted with General Electric Company (GE) to provide sump strainers. GE provided FNP with seven horizontal stacked disk strainers and one vertical stacked disk strainer. The strainers were installed in both Unit 1 and Unit 2. Unit 1 has the only vertical stacked strainer installed on the B-Train CS pump suction. The strainers for FNP Unit 1 and Unit 2 are located outside the bio-wall between the bio-wall and containment outside wall. This location protects the strainers from internally generated missile impacts.

For Unit 1 each strainer assembly for both RHR strainers and CS A-Train strainer consists of two modular horizontal stacked disk strainer sub-units connected to the post LOCA pump suction through piping. The CS B-Train strainer assembly consists of three modular vertical stacked disk strainer sub-units connected to a plenum that assists in directing flow to the post LOCA pump suction inlet located within the plenum boundary. The RHR strainer assembly, either A-Train or B-Train, is composed of two strainer sub-units per sump, each consisting of 22 stacked disks that are 40" X 40" and provide a total of approximately 878 ft^2 of perforated plate surface area. The CS A-Train strainer assembly consists of one strainer sub-unit with (22) 40" X 40" stacked disks and the other with (10) 40" X 40" stacked disks, providing a total of approximately 638 ft^2 of perforated plate surface area. The CS B-Train strainer assembly is composed of three strainer sub-units, each with (13) 30" X 30" vertical stacked disks, and provides a total of approximately 389 ft^2 of perforated plate surface area.

For Unit 2 each strainer assembly for RHR and CS consists of two modular horizontal stacked disk strainers connected to the sump through piping. The RHR strainer assemblies, both A-Train and B-Train, are composed of two strainers per sump, each consisting of 22 stacked disks that are 40" X 40" and provide a total of approximately 878 ft^2 of perforated plate surface area. The CS A-Train strainer assembly consists of one strainer with (22) 40" X 40" stacked disks and the other with (10) 40" X 40 stacked disks, providing a total of approximately 638 ft^2 of perforated plate surface area. The CS B-Train strainer assembly is composed of two strainers, one with of (10) 40" X 40" stacked disks and the other with (22) 30" X 30" disks, and provides a total of approximately 433 ft^2 of perforated plate surface area.

4.2.3 Debris Generation

Debris generation analysis has been completed. Insulation inside containment that is affected during a LOCA event is mostly Reflective Metal Insulation (RMI) with very little fiber. A walkdown of containment has been performed and the amount of latent debris is very small. The qualified coatings in containment are in good condition. Periodic condition assessments are performed and as localized areas of degradation are identified, those areas are evaluated and scheduled for repair or replacement as necessary. These periodic condition assessments, and the resulting repair/replacement activities ensure that the amount of coatings that may be susceptible to detachment from the substrate during a LOCA event is minimized.

4.2.4 Leak-Before-Break (LBB)

Postulated breaks in the reactor coolant loop and the pressurizer surge line have been eliminated for both Unit 1 and Unit 2 by application of leak-before-break technology. Justification was provided in WCAP 12825, January 1991, "Technical Justification for Eliminating Large Primary Loop Pipe Rupture as the Structural Design Basis for the Joseph M. Farley Units 1 and 2 Nuclear Power Plants," and WCAP 12835, April 1991, "Technical Justification for Eliminating Pressurizer Surge Line Rupture from the Structural Design Basis for Farley Units 1 and 2."

While leak-before-break is not being used to establish the design basis debris load on the new sump screens, the use of LBB would result in a substantial reduction in the zone of influence, and thus a significant reduction in the postulated debris generation, loading on the sump screens, and potential clogging of the throttle valves. With the installation of the additional sump screen area, the possibility of screen clogging due to debris is greatly reduced. With a smaller screen opening size, the potential of debris passing through the

screens capable of clogging the throttle valves is reduced. Therefore, the operation of Unit 1 and 2 during this extension period is acceptable.

4.2.5 Containment Floor Configuration

Heavy particles are impeded from reaching the sumps because the new screens are mounted approximately four inches above the containment floor. This facilitates settling of debris on the floor prior to reaching the sump area. This raised mounting would allow accumulation of debris below the screen inlet levels and the possibility of sump screen clogging is reduced. In addition, debris interceptors have been installed to limit the amount of debris reaching the screens. These debris interceptors are not credited for reduction of debris transported to the screens.

4.2.6 Zone-Of-Influence Reduction for Qualified Coatings

FNP is currently applying a reduction in the Zone-of-Influence for Qualified Coatings in accordance with WCAP-16568, "Jet Impingement Testing to Determine the Zone of Influence (ZOI) for DBA-Qualified / Acceptable Coatings." The ZOI value being used is 4D. This has resulted in a lower particulate loading on the sump screens, allowing for additional margin. In addition, reduction of the ZOI results in less overall debris generation, reducing the potential of high head safety injection throttle valves.

4.2.7 Emergency Containment Coolers

Safety-related emergency containment coolers can supplement containment heat removal capability if spray flow is degraded.

4.2.8 Procedure Guidance, Training and Actions

By letter dated August 7, 2003, SNC responded to NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized Water Reactors." SNC's letter stated that Farley had implemented the following interim compensatory measures and these measures will continue in effect until such time that all evaluations and all required plant modifications are complete:

- Training on monitoring of indications of and responses to sump clogging; enhancement of ECCS logs to provide additional detail concerning the recognition and response to ECCS sump suction screen fouling; new training materials and job performance measures addressing the need for long-term monitoring of the recirculation phase; how to recognize that sump blockage is taking place; and actions to be taken if blockage is encountered.

- Guidance to reduce depletion of the RWST and initiate makeup to the RWST from normal and alternate sources during efforts to restore normal ECCS flowpaths.

- Containment exit inspections with logged material accounting procedures, and comparable controls for emergency entries into containment; and post-outage ECCS recirculation sump cleanliness and material control procedures to ensure the sumps are free of debris (trash, rags, protective clothing, etc.).

- Post-refueling and heat-up procedures to inspect that reactor cavity drains are properly restored with their blind flanges and drain covers removed.

- Inspections to ensure ECCS subsystem inlets are not restricted by debris and sump components (trash racks, screens, etc.) show no evidence of abnormal corrosion or structural distress, and that the sump screens are correctly configured.

4.2.9 Containment Cleanliness

A containment exit inspection procedure is implemented after every containment entry and during each refueling outage, prior to entering Mode 4 from Mode 5 and establishing containment integrity. The primary purpose of this procedure is to ensure compliance with the Farley Technical Requirements Manual by verifying that no loose debris (rags, trash, clothing, etc.) is present in the Containment Building which could be transported to the emergency sump and cause restriction of ECCS pump suctions during LOCA conditions.

In addition to the procedure described above, a post maintenance containment inspection procedure establishes comparable controls for ensuring emergency sump cleanliness and integrity for containment entries in Modes 1 through 4. When in Modes 1-4, the procedure also requires that any material taken into containment be logged in and the disposition of each item recorded (e.g., installed, removed).

Based on the above discussion, SNC meets the requirements of SECY-06-0078 Criterion No. 2.

5.0 Risk Assessment

The design features and the administrative controls listed in the Justification for Extension and the Mitigative Measures sections adequately support the risk of this extension request. In addition, NRC letter dated November 8, 2007 to Mr. Anthony R. Pietrangelo of NEI stated that extension requests beyond June 30, 2008 should include a quantitative risk assessment to support its request. Since the extension request for downstream effects evaluations / chemical effects testing and evaluations is not requested beyond June 30, 2008, no quantitative risk assessment is required.

6.0 Conclusion

Per the criteria listed in SECY 06-0078, SNC has established a plant-specific plan with milestones and schedules to address outstanding technical issues with enough margin to account for uncertainties. Additionally, SNC has identified mitigative measures to be put in place by December 31, 2007, and adequately described how these mitigative measures will minimize the risk of degraded ECCS functions during the extension period.

Joseph M. Farley Nuclear Plant - Units 1 and 2
Generic Letter 2004-02 Response Extension Request – Chemical Effects

Enclosure 2

List of Regulatory Commitments

Joseph M. Farley Nuclear Plant - Units 1 and 2
Generic Letter 2004-02 Response Extension Request – Chemical Effects

Enclosure 2

List of Regulatory Commitments

The following table identifies those actions committed by Southern Nuclear Operating Company in this document Farley Nuclear Plant. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

Regulatory Commitments	Due Date / Event
FNP will be in compliance with the regulatory requirements listed in the Applicable Regulatory Requirements section of GL 2004-02. With exception of the previously approved extension for Unit 2 SI throttle valve replacement scheduled to be completed in the Fall 2008 refueling outage. Extension approved in NRC letter dated August 29, 2007.	April 30, 2008