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NL-03-1514

August 7, 2003

Docket Nos.: 50-348 50-424  
50-364 50-425

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

Joseph M. Farley Nuclear Plant  
Vogtle Electric Generating Plant  
60 Day Response to NRC Bulletin 2003-01  
Potential Impact of Debris Blockage on Emergency Sump Recirculation  
at Pressurized Water Reactors

Ladies and Gentlemen:

The U. S. Nuclear Regulatory Commission (NRC) issued NRC Bulletin 2003-01 to inform licensees of the potential for additional adverse effects due to debris blockage of flowpaths necessary for Emergency Core Cooling System (ECCS) and Containment Spray System (CSS) recirculation and containment drainage. These additional adverse effects were based on NRC-sponsored research that identified the potential susceptibility of pressurized-water reactor (PWR) recirculation sump screens to debris blockage in the event of a high energy line break (HELB) that would require ECCS and CSS operation in the recirculation mode.

In accordance with 10 CFR 50.54(f), the NRC requested a response within 60 days of the date of the NRC Bulletin to either: 1) state that the ECCS and CSS recirculation functions have been analyzed with respect to the potentially adverse post-accident debris blockage effects identified in the NRC Bulletin and are in compliance with 10 CFR 50.46(b)(5) and all existing applicable regulatory requirements (Option 1); or 2) describe any interim compensatory measures that have been or will be implemented to reduce the risk which may be associated with the potentially degraded or nonconforming ECCS and CSS recirculation functions until an evaluation to determine compliance has been completed (Option 2).

The enclosures to this letter contain the Farley Nuclear Plant (enclosure 1) and the Vogtle Electric Generating Plant (enclosure 2) responses to Option 2 of the Requested Information in Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors," dated June 9, 2003.

JEH

Mr. J. T. Gasser, 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.

This letter contains no NRC commitments. If you have any questions, please advise.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

  
Jeffrey T. Gasser

Sworn to and subscribed before me this 7<sup>th</sup> day of August, 2003.

  
Notary Public

My commission expires: 11/10/06

JTG/KWK/sdl

- Enclosures: 1. FNP 60 Day Response to Bulletin 2003-01  
2. VEGP 60 Day Response to Bulletin 2003-01

cc: Southern Nuclear Operating Company  
Mr. J. D. Woodard, Executive Vice President  
Mr. J. B. Beasley, Jr., Vice President, Plant Farley  
Mr. J. T. Gasser, Vice President, Plant Vogtle  
Mr. D. E. Grissette, General Manager – Plant Farley  
Mr. W. F. Kitchens, General Manager – Plant Vogtle  
Document Services RTYPE: CFA04.054; CVC7000; LC# 13813

U. S. Nuclear Regulatory Commission  
Mr. L. A. Reyes, Regional Administrator  
Mr. F. Rinaldi, NRR Project Manager – Farley & Vogtle  
Mr. T. P. Johnson, Senior Resident Inspector – Farley  
Mr. J. Zeiler, Senior Resident Inspector – Vogtle

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**Enclosure 1**

**Farley Nuclear Plant 60 Day Response to Bulletin 2003-01**

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Enclosure 1

Farley Nuclear Plant 60 Day Response to Bulletin 2003-01

In addressing the potential impact of debris blockage on emergency sump recirculation, Farley Nuclear Plant (FNP) has considered the following interim compensatory measures and reviewed existing practices to minimize potential risk. These interim compensatory measures have been implemented to reduce the risk which may be associated with potentially degraded or nonconforming Emergency Core Cooling System (ECCS) and Containment Spray System (CSS) recirculation functions until an evaluation to determine compliance is complete.

1. Operator training on indications of and responses to sump clogging.

FNP Response:

The initial operator training and continuing training includes the monitoring of operating ECCS and CSS pumps for indications of pump distress or loss of NPSH, such as erratic current, flow or discharge pressure. Operator guidance for the loss of the Safety Injection (SI) recirculation function is currently contained in Westinghouse Owners Group (WOG) Emergency Response Guideline (ERG) ECA-1.1, "Loss of Emergency Coolant Recirculation." The loss of sump recirculation due to sump blockage is a potential entry point to this existing guidance.

The ECCS logs have been enhanced to provide additional detail concerning the recognition and response to ECCS sump suction screen fouling. Parameters to be monitored on the ECCS logs include Residual Heat Removal (RHR)/Low Head Safety Injection (LHSI) pump amps, Charging/High Head Safety Injection (HHSI) pump amps, LHSI flow, HHSI flow and CSS flow. These parameters are annotated with actions to take on indications of pump cavitation or signs of sump screen blockage. A Training Advisory Notice (TAN) has been issued to licensed personnel detailing the changes made to the ECCS logs. A Job Performance Measure (JPM) exercising the use of ECCS logs currently exists. This JPM includes interpreting indications of ECCS pump cavitation and providing the proper response.

2. Procedural modifications, if appropriate, that would delay the switchover to containment sump recirculation (e.g., shutting down redundant pumps that are not necessary to provide required flows to cool the containment and reactor core, and operating the CSS intermittently).

FNP Response:

The existing procedural guidance only addresses actions for a complete loss of SI or CSS recirculation flow path. FNP is in agreement with the WOG that existing procedural guidance dealing with a complete loss of ECCS recirculation capability is sufficient to address a complete loss of ECCS recirculation function. FNP will review WOG recommended procedural modifications when issued and determine if any FNP specific changes are required.

The additions to the ECCS logs described in response to item 1 have been made. The log directs the operating crew to transition to ECA-1.1, "Loss of Emergency Coolant Recirculation," if both ECCS trains are lost, or consult with the Technical Support Center (TSC) staff for conditions affecting only one train of ECCS equipment. This reinforces the continuing action step in ES-1.3, "Transfer to Cold Leg Recirculation," which directs the transition to ECA-1.1 when "at least one train of flow from the containment sump to the RCS can NOT be established or maintained." The procedure provides adequate action to reduce Refueling Water Storage Tank (RWST) depletion while initiating makeup to the RWST. In addition, the procedure provides guidance to reduce ECCS and CSS flows to conserve RWST inventory while efforts to restore normal ECCS flow paths are undertaken. Accordingly, this procedure provides adequate action to provide and ensure long term core temperature stabilization while actions are taken to restore recirculation capability should the sump be lost due to blockage.

3. Ensuring that alternate water sources are available to refill the RWST or to otherwise provide inventory to inject into the reactor core and spray into the containment atmosphere.

FNP Response:

Procedure ECA-1.1, "Loss of Emergency Coolant Recirculation," has guidance to add makeup to the RWST using normal operating procedures and/or consult the TSC staff to determine alternate sources for makeup. Severe Accident Management Guideline, SAG-8, "Flood Containment," details potential alternate un-borated sources of RWST makeup that the TSC staff may consider.

4. More aggressive containment cleaning and increased foreign material controls.

FNP Response:

Procedure, "Containment Inspection (General)," provides detailed guidance for containment inspection to ensure no loose debris (rags, trash, clothing, etc.) is present in the containment which could be transported to the containment sump and cause restriction of pump suction during LOCA conditions. This procedure contains an extensive checklist detailing all areas of containment that must be inspected for cleanliness prior to plant startup after each outage.

Procedure, "Containment Inspection (Post Maintenance)," establishes guidance to inventory and control items carried into containment during non-outage entries. This procedure ensures that no loose debris (rags, trash, clothing, etc.) are present in the containment which could be transported to the containment sump and cause restriction of pump suction during LOCA conditions.

5. Ensuring containment drainage paths are unblocked.

FNP Response:

Procedure, "Controlling Procedure for Refueling," checks that the cavity drain valves are open and their blind flanges removed after completion of refueling activities. Procedure, "Containment Inspection (General)," also verifies these valves are open and their blind flanges are removed.

6. Ensuring sump screens are free of adverse gaps and breaches.

FNP Response:

Procedure, "Containment ECCS Sump Intake Inspection," is performed during each refueling outage. This procedure ensures that the ECCS sump suction screens are not restricted by debris, the sump components (trash racks, screens, inner cages) are properly installed and show no evidence of structural distress or corrosion, the wire mesh on the sump suction inlet screens is not damaged, and gaps greater than 1/8 inch are not present in the mesh.

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**Enclosure 2**

**Vogtle Electric Generating Plant 60 Day Response to Bulletin 2003-01**

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**Enclosure 2**

**Vogtle Electric Generating Plant 60 Day Response to Bulletin 2003-01**

In addressing the potential impact of debris blockage on emergency sump recirculation, Vogtle Electric Generating Plant (VEGP) has considered the following interim compensatory measures and reviewed existing practices to minimize potential risk. These interim compensatory measures have been implemented to reduce the risk which may be associated with potentially degraded or nonconforming Emergency Core Cooling System (ECCS) and Containment Spray System (CSS) recirculation functions until an evaluation to determine compliance is complete.

**1. Operator training on indications of and responses to sump clogging.**

**VEGP Response:**

The current Initial Operator Training and Continuing Training programs contain materials relating to ECA 1.1, "Loss of Emergency Coolant Recirculation." This would be the appropriate guidance for dealing with a complete loss of Emergency Coolant recirculation capability. Training materials discuss in detail the transfer to recirculation and the indication used to determine the inability to establish recirculation as well as the actions to be taken as a result of loss of recirculation capability.

The VEGP Integrated Plant Computer (IPC) can be manually accessed to monitor indications needed to ensure adequate ECCS flow through both the injection and recirculation phase. These include:

1. Residual Heat Removal (RHR) flow, discharge pressure, and pump amps along with containment sump level input into the Critical Safety Function Status Trees (CSFST) to provide alarm and indication for a potential loss of RHR capability.
2. Centrifugal Charging Pump (High Head Safety Injection (HHSI)) and Safety Injection Pump (Intermediate Head Safety Injection (IHSI)) flow and discharge pressure are also easily monitored on the IPC.
3. The Technical Support Center (TSC) has preformatted displays for monitoring ECCS flow and containment parameters to address ECCS capability.

It has been determined that additional training material is needed to address the need for long-term periodic monitoring of the recirculation phase, how to recognize RHR sump blockage is taking place, and the actions to be taken. A standing order has been



issued by the Operations Department to emphasize the need for continuous monitoring of ECCS recirculation parameters to identify degrading conditions and actions to be taken if blockage is encountered. More detailed information and guidance on ECCS and CSS emergency sump blockage will be provided to all licensed operators in continuing training commencing January 12, 2004, with all licensed operators having completed training by February 23, 2004. In the interim, the Training Department will develop the needed training materials and simulator scenarios based on input from Operations and Engineering for this training. Changes to Initial Licensed Operator training materials will also be completed by February 23, 2004.

2. Procedural modifications, if appropriate, that would delay the switchover to containment sump recirculation (e.g., shutting down redundant pumps that are not necessary to provide required flows to cool the containment and reactor core, and operating the CSS intermittently).

VEGP Response:

The existing procedural guidance only addresses actions for a complete loss of SI or CSS recirculation flow path. VEGP is in agreement with the Westinghouse Owners Group (WOG) that existing procedural guidance dealing with a complete loss of ECCS recirculation capability is sufficient to address a complete loss of ECCS recirculation function. VEGP will review WOG recommended procedural modifications when issued and determine if any VEGP specific changes are required.

The standing order issued to the operating crews emphasized monitoring ECCS parameters to identify degradation of flow and to initiate ECA-1.1, "Loss of Emergency Coolant Recirculation," when flow degradation is indicated. The procedure provides adequate action to reduce Refueling Water Storage Tank (RWST) depletion while initiating makeup to the RWST. In addition, the procedure provides guidance to reduce ECCS and CSS flows to conserve RWST inventory while efforts to restore normal ECCS flow paths are undertaken. Accordingly, this procedure provides adequate action to provide and ensure long term core temperature stabilization while actions are taken to restore recirculation capability should the sump be lost due to blockage.

3. Ensuring that alternate water sources are available to refill the RWST or to otherwise provide inventory to inject into the reactor core and spray into the containment atmosphere.

VEGP Response:

Procedure ECA-1.1, "Loss of Emergency Coolant Recirculation," has guidance to add makeup to the RWST using normal operating procedures and/or consult the TSC staff to determine alternate sources for makeup. Severe Accident Management Guideline, SAG-8, "Flood Containment," details potential alternate un-borated sources of RWST makeup that the TSC staff may consider.

4. More aggressive containment cleaning and increased foreign material controls.

VEGP Response:

Containment general inspection guidelines are performed, by procedure, as early as practical during any outage or shutdown that lasts longer than 72 hours at the discretion of the Shift Superintendent. The primary purpose of the procedure is to look for leaks and items in need of repair inside containment, but it also includes specific requirements for inspecting and evaluating the containment material condition. The inspection of sump screens and racks for cleanliness, damage, corrosion, and stability are explicitly required.

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. During the transition to Mode 4, the procedure also requires that any material taken into containment be logged in and out. Logged materials remaining inside containment after Mode 4 entry must be attended at all times and capable of being removed promptly in the event of an emergency. The primary purpose of this procedure is to ensure compliance with the Vogtle Technical Requirements Manual by verifying that no debris is present in the Containment Building which could be transported to the emergency sump and cause restriction of ECCS pump suctions during LOCA conditions. The procedure includes a data sheet detailing materials normally left inside containment. The data sheet is used to evaluate the status of these materials and verify that approved limits are not exceeded.

In addition to the Operations Department procedures described above, Vogtle administrative procedures establish comparable controls for ensuring emergency sump cleanliness and integrity for containment entries in Modes 1 through 4.

5. Ensuring containment drainage paths are unblocked.

VEGP Response:

VEGP Unit Operating Procedures for post refueling operations (Mode 6 to Mode 5), and for unit heatup to hot Shutdown (Mode 5 to Mode 4), include provisions for ensuring the reactor cavity drains are properly restored for plant operation following completion of cavity decontamination activities. A procedure checklist is completed, ensuring and documenting verification that drain line blind flanges and other equipment used strictly for outage operations are removed and/or properly aligned for normal plant operation.

6. Ensuring sump screens are free of adverse gaps and breaches.

VEGP Response:

A containment emergency sump inspection procedure provides guidelines for performing detailed inspections of the containment emergency sumps. This procedure is performed prior to returning to power after each refueling outage and is designed to ensure compliance with VEGP Technical Specification requirements

relative to emergency sump cleanliness and material condition. The procedure ensures the sumps are free of debris such as trash, rags, tools or protective clothing; that the ECCS and CSS subsystem inlets are not restricted by debris; that the sump screens and trash racks are free of debris and show no evidence of abnormal corrosion or structural distress such as broken mesh, holes, dents or bent members; and the sump screens and trash racks are correctly configured and securely bolted in place.