Duke Energy®

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

Subject: Duke Power Company LLC d/b/a Duke Energy Carolinas, LLC
McGuire Nuclear Station, Unit 2
Docket Nos. 50-370
NRC Generic Letter 2004-02, Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors, Request for Relief from December 31, 2007 Implementation

On September 13, 2004 the Nuclear Regulatory Commission (NRC) issued Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors." Duke Power, currently Duke Energy Carolinas (Duke) provided the required responses on March 1, 2005 and September 1, 2005.

On February 9, 2006, the NRC issued requests for additional information (RAI) for Oconee, McGuire and Catawba Nuclear Stations. Subsequent to these requests, on February 28, 2006, the Nuclear Energy Institute (NEI) submitted a request to extend the response dates to the RAIs on behalf of PWR licensees.

On March 3, 2006 the NRC provided a response to Anthony R. Pietrangelo of NEI granting the requested schedule relief. Duke's April 7, 2006 letter was submitted to inform the NRC that Duke would take advantage of the schedule relief granted by the NRC by submitting responses to RAIs contained in the February 9, 2006 letters by December 31, 2006.

This letter is being provided to request relief from the December 31, 2007 date for resolution of GSI-191 for McGuire Unit 2. Some delays have been encountered in the design process due to space limitations in McGuire's ice condenser containments. During the final design reviews and confirmation tests, McGuire identified weaknesses in the contractor's conceptual layout of the replacement sump. The main issues were lack of margin to address the issue of chemical effects and the physical restrictions to pipe chase traffic that would be created by the completed installation. These issues

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have necessitated that the majority of the additional strainer surface be redesigned and relocated. Because of this design delay, McGuire is requesting an extension of the December 31, 2007 date for resolution of GSI-191 until the spring outage in 2008 for Unit 2. This is an extension of approximately 3 months.

The McGuire Unit 1 sump strainer schedule commitments are unchanged, with full modification installation scheduled for Spring 2007.

Attachment 1 provides more detail regarding the above delays, as well as descriptions of the planned two-phase implementation of hardware modifications and other compensatory measures that will be taken for McGuire Unit 2 prior to final resolution of GSI-191. Upon completion of Phase 1 of strainer modifications (to be implemented during Fall 2006), the available strainer surface area will increase from approximately 135 square feet to 1100 square feet.

If any questions arise or additional information is needed, please contact Mary Shipley at (704) 382-5880.

Very truly yours,

Henry B. Barron,
Chief Nuclear Officer
Duke Energy Corporation

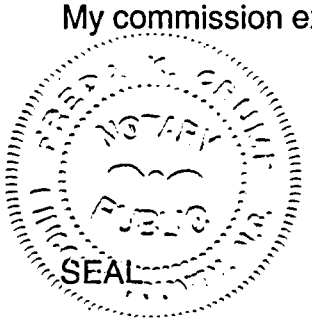
Henry B. Barron affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.

Henry B. Barron
Chief Nuclear Officer
Duke Energy Corporation

Subscribed and sworn to me: June 28, 2006
Date

Freda K. Crump
Notary Public

My commission expires: August 17, 2006
Date



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Attachment 1
Justification for Extension of Resolution of GSI-191 for McGuire Unit 2

SECY-06-0078, "Status of Resolution of GSI-191, "Assessment of [Effect of] Debris Accumulation on PWR Sump Performance" dated March 31, 2006 provides criteria for evaluating Delay of Hardware Changes related to resolution of GSI-191. SECY-06-0078 states that:

> Proposed extensions to permit changes at the next outage of opportunity after December 2007 may be acceptable if, based on the licensee's request, the staff determines that;
>
> - 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 and
>
> - 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 and CSS functions during the extension period.

Background

In the September 1, 2005 response to GL 2004-02, McGuire stated our intent to modify the existing containment sump to increase effective strainer area to approximately 2000 ft^2. The available layout space for this expanded sump was identified as a combination of pipe chase (existing sump footprint plus significant walkway area) and containment floor space inside the crane wall. (Substantial removal/relocation of interference items is a prerequisite to strainer installation in these areas.)

After determining the final available space provided by moving all interferences deemed practical, and accounting for strainer submergence requirements (ensuring all strainer surface remains below the 2.75 ft flood level), the maximum strainer surface area that could be accommodated was approximately 1700 ft^2. This surface area was originally considered adequate by our engineering vendor.

During the final design reviews and confirmation tests, McGuire raised concerns with the contractor's conceptual layout of the replacement sump. The primary issues were:

a) Impacts on pipe chase accessibility:
The proposed layout has significant adverse impacts on practical access and transport for materials in the pipe chase area, with several passageway restrictions reduced to a vertical clearance of less than 20 inches. This additional congestion will increase maintenance durations and personnel dose, as well as pose added safety risks due to tight confines and complications in the possible evacuation of injured personnel.

b) Lack of design margin:
Although analysis supported the adequacy of this reduced strainer surface area, it was determined that the design lacked the necessary margin to confidently allow unresolved issues from chemical effects to be addressed.

To address the above concerns, the sump modification was redesigned to allow a two phase implementation for the increase area sump strainer. The strainer modules located in the pipechase walkway area will be deleted and additional strainer area will be added inside the crane wall. This change in design results in a substantial increase in the scope of interference removal; namely, the removal of one train of the containment purge recirculation filter package and fan. Additionally, significant increases in the scope of fabrication of plenums, strainer modules and strainer enclosure are associated with this modification redesign effort.

Risk Assessment

A probabilistic risk assessment (PRA) was performed by Duke Energy Corporation that specifically assessed the impact of extending the time for implementing the final Phase 2 sump strainer modification at McGuire Unit 2 until the spring 2008 refueling outage (70 day delay assumed).

The risk assessment is believed to be conservative because of the following:

- took no credit for actual available net positive suction head (NPSH) margin that exists at the plant,
- gives only modest credit for operator mitigation regarding failure of actions to recover from loss of Emergency Core Cooling System (ECCS) during recirculation and restoring injection from the Refueling Water Storage Tank (RWST),
- gives only modest credit for previous compensatory actions taken by the plant in response to NRC Bulletin 2003-01 and GL 2004-02 such as development of a specific Emergency Procedure to address containment sump blockage and associated operator training, and
- includes conservative assumptions regarding the potential for sump blockage.

The following were reviewed to ensure the analysis approach used was reasonable and consistent with the various industry documents listed.

- WCAP-16362, *PRA Modeling Template for Sump Blockage* (April 2005),
- NUREG/CR-6771, *GSI-191: The Impact of Debris-Induced Loss of Emergency Core Cooling System (ECCS) Recirculation on Pressurized Water Reactor (PWR) Core Damage Frequency,*
- *NEI 04-07, Pressurized Water Reactor Sump Performance Evaluation Methodology,*

- *LA-UR-02-7562, The Impact of Debris-Induced Loss of ECCS Recirculation on PWR Core Damage Frequency, and*
- *WCAP-16204, Evaluation of Potential ERG and EPG Changes to Address NRC Bulletin 2003-01 Recommendations.*

The results of the PRA demonstrated that the risk of extending the modification schedule by 70 days is <1E-6.

Interim Modification/Measures Planned to be Completed During the Fall 2006 Refueling Outage

1. Phase 1 of ECCS Sump Strainer Modification:
Removal of the existing train-specific ECCS sump strainers will be performed. Approximately 1100 ft^2 of gross strainer surface area will be installed. This strainer area will be interconnected such that either ECCS train can take suction from the combined total strainer structure.

2. Microtherm Insulation Replacement
The twelve panels of Microtherm insulation that are installed on the Unit 2 reactor vessel head will be removed and replaced with reflective metal insulation. Micro-porous fiber debris is an acknowledged 'bad actor' for strainer blockage and associated head loss.

By significantly increasing the available strainer surface (as compared to the existing total sump screen area of 135 ft^2), and by eliminating the worst debris type (micro-porous fiber), it is qualitatively judged that the likelihood of strainer blockage is substantially decreased.

Programmatic Controls to Reduce Debris in Containment

McGuire has several programmatic controls in place to ensure that potential sources of debris introduced into containment will be assessed for adverse effects on the ECCS and Containment Spray System recirculation functions. These programmatic controls include requirements related to coatings, containment housekeeping, materiel condition and modifications. Some programmatic controls are described in more detail below.

1. Coating Program
As described in Duke's November 11, 1998 response to Generic Letter 98-04, "Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System after a Loss-of-Coolant Accident Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment," Duke has established controls for the procurement, application, and maintenance of Service Level 1 protective coatings used inside containment. The requirements of 10 CFR 50, Appendix B are implemented through the specification of appropriate technical and quality requirements for the Service

Level 1 coating program. For Service Level 1 coatings, Duke is committed to comply with Regulatory Guide 1.54 at McGuire. As described in the Generic Letter 98-04 response, vendor-coated mechanical and electrical equipment coatings are considered unqualified.

2. Containment Housekeeping/Materiel Condition
Duke's August 7, 2003 response to Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized Water Reactors," described planned actions regarding containment cleanliness. These actions have been implemented and involve containment cleaning and visual inspections.

Extensive containment cleaning is performed during each refueling outage using water spray, vacuuming, and hand wiping. In general, this is limited to the space in lower containment that would be submerged under large break LOCA conditions. Additionally, localized washdowns are performed as needed. Visual inspections are performed on the remaining areas of containment. Foreign material is removed as necessary. Material accountability logs are maintained in Modes 1 through 4 for items carried into and out of containment. These controls are implemented using administrative procedures.

3. Modification Process
Duke's modification process currently includes an administrative procedure that directs the design and implementation of engineering changes to the plant. This procedure directs that engineering changes be evaluated for system interactions. As part of this evaluation, there is direction to include consideration of any potential adverse effect with regard to debris sources and/or debris transport paths associated with the containment sump.

Operator Actions and Training

McGuire's May 27, 2004 supplemental response to Bulletin 2003-01 committed to the following actions that were recommended by WCAP-16204 to reduce the risk associated with potential containment emergency sump blockage during ECCS and Containment Spray recirculation functions. These commitments included:

- Initiate refueling water storage tank makeup following the successful transfer of ECCS and containment spray suction to the containment emergency sump
- Describe the symptoms of sump clogging problems, and
- Originate a response procedure to provide guidance for the potential of both trains of ECCS and containment spray being affected by containment sump blockage.

Additionally, Duke implemented procedure changes to:

- Move the step to shut down a containment spray pump when no longer required to mitigate the event to earlier in the procedure, and
- Added a step to manually start a containment air return fan to enhance air flow through the ice condenser.

These actions were completed and documented in the Duke corrective action program.

Implementation Schedule

Prior to the Fall 2006 outage, a redesign of the originally proposed strainer will be performed to accommodate installation of the replacement strainer in two phases. Phase 1 includes those portions of the strainer to be installed in the Fall 2006 outage. The Phase 1 redesign will remove the pipe chase portion of the proposed strainer design, redesign the lower containment portion to accept future expansion, and redesign the plenums in the pipe chase. During installation of Phase 1 in the Fall 2006, interferences will be removed and other work will be performed in preparation of the installation of Phase 2.

The Phase 2 portion of the redesign will address the expansion of the lower containment strainer in the Spring 2008 outage. Phase 2 design will be completed early 2007. Installation of Phase 2 will occur in the Spring 2008 outage.