Duke Power®
A Duke Energy Company

GARY R. PETERSON
Vice President
McGuire Nuclear Station

Duke Power
MG01VP / 12700 Hagers Ferry Rd.
Huntersville, NC 28078-9340

704 875 5333
704 875 4809 fax
grpeters@duke-energy.com

November 6, 2007

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, Units 1 and 2
Docket Nos. 50-369 and 50-370

Request for Extension of Completion Dates for McGuire Units 1 and 2 Corrective Actions Required by NRC Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors"

Duke Power Company LLC d/b/a Duke Energy Carolinas, LLC (Duke), requests that the date for completing the corrective actions required by GL 2004-02 at McGuire Units 1 and 2 be extended to April 30, 2008 in order to complete the formal documentation of the Integrated Prototype (chemical effects) testing. The requested period of extension is four (4) months after the December 31, 2007 date specified by GL 2004-02.

On February 9, 2006, the NRC issued a Request for Additional Information (RAI) regarding issues identified in GL 2004-02. In its May 3, 2007 letter, Duke committed to providing McGuire's response to this RAI on or before December 31, 2007. Duke is fully committed to resolving GSI 191 and will provide a supplemental response to GL 2004-02 (including the RAIs) by December 31, 2007. However, Duke Integrated Prototype Test (IPT) and other calculational refinements are still being performed in support of the McGuire Units 1 and 2 ECCS Sump Strainer design. As a result, Final IPT reports and formal documentation of this information will not be available from the vendor in sufficient time to be incorporated into the refined McGuire sump strainer analyses prior to December 31, 2007. Therefore, additional or revised information resulting from the IPT will be provided as an amended response to GL 2004-02 by April 30, 2008.

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The requested extension of the McGuire Unit 1 and Unit 2 dates for the completion of the corrective actions required by GL 2004-02 will have no impact on the health and safety of the public because:

- Duke has conducted in-house analysis and testing, and has implemented physical improvements to ensure a high level of ECCS sump performance,
- McGuire has put in place permanent mitigative and compensatory measures to minimize the risk of degraded ECCS/CSS functions during the requested period of extension,
- Duke's IPT is designed to provide a representative post-accident sump environment and sump strainer challenge for the McGuire Units, and
- Insights gained from Duke's previous in-house chemical effects testing provide high confidence that the IPT will yield acceptable NPSH margin on the modified ECCS Sump Strainer Assembly.

Additionally, the McGuire Unit 2 ECCS Sump Strainer modifications will be completed during this 4 month period. Given these factors, and the fact that Duke endeavors to provide an accurate and complete response commensurate with the significance of GSI 191, a 4 month extension is prudent.

Enclosure 1 provides the bases for the proposed extension of the McGuire Unit 1 and 2 GL 2004-02 completion date. Enclosure 2 provides the regulatory commitments made in this letter.

Your approval of this extension is requested by December 31, 2007.

If any questions arise or additional information is needed, please contact K. L. Ashe at (704) 875-4535.

Very truly yours,

Gary R. Peterson

Gary R. Peterson 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.

Gary R. Peterson
Vice President
Duke Energy Corporation

Subscribed and sworn to me: 11/6/07
Date

Lori C. Gibby / Lori C. Gibby
Notary Public

My commission expires: 7/1/12
Date

SEAL

xc: w/attachments

W. D. Travers, Region II Administrator
U.S. Nuclear Regulatory Commission
Sam Nunn Atlanta Federal Center, 23 T85
61 Forsyth St., SW
Atlanta, GA 30303-8931

J. F. Stang, Jr., Senior Project Manager (MNS)
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Mail Stop 0-8 H 4A
Rockville, MD 20852-2738

J. B. Brady
NRC Senior Resident Inspector
McGuire Nuclear Station

B. O. Hall, Senior Chief
Division of Radiation Section
1645 Mail Service Center
Raleigh, NC 27699-1645

Enclosure 1

Bases for Request for Extension of Completion Dates for McGuire Units 1 and 2
Corrective Actions Required by Generic Letter 2004-02

Bases for Request for Extension of Completion Dates for McGuire Units 1 and 2 Corrective Actions Required by Generic Letter 2004-02

Background

USNRC Generic Letter (GL) 2004-02 required that licensees provide a description of and implementation schedule for all corrective actions, including any plant modifications that were identified in responding to the GL. The GL further requested that licensees complete all required corrective actions by December 31, 2007, or provide justification for continued operation until those actions were completed.

In a letter to the NRC dated June 28, 2006 (replaced in its entirety by letter of February 9, 2007), Duke requested an extension to permit the completion of ECCS Sump Strainer modifications for Unit 2 during the Spring 2008 refueling outage. NRC approval of this extension is pending.

On March 1 and September 1, 2005, Duke submitted a listing of those actions it was taking to address GL 2004-02 and updated the status of those actions in its letter of June 28, 2006. The current status of those actions is listed in Table 1.

On February 9, 2006, the NRC issued a Request for Additional Information (RAI) regarding issues identified in GL 2004-02. In its May 3, 2007 letter, Duke committed to providing McGuire's response to this RAI on or before December 31, 2007. Results of the Integrated Prototype Test (IPT) for chemical effects and supporting evaluations may not be available in sufficient time to allow for formal incorporation into the refined McGuire ECCS Sump Strainer head loss certification. Therefore, in order to complete the modification of Unit 2's ECCS Sump Strainer, conduct the IPT, evaluate the test results and complete supporting documentation, this submittal requests that the date for completing all corrective actions required by GL 2004-02 for McGuire be extended to April 30, 2008. The requested period of extension for McGuire Units 1 and 2 is four months after the December 31, 2007 date specified by GL 2004-02.

Duke will provide a supplemental response to GL 2004-02 (including the RAIs) by December 31, 2007. Any additional or revised information resulting from the IPT evaluation will be provided as an amended response to GL 2004-02 by April 30, 2008.

McGuire has installed new modular ECCS Sump Strainers in Units 1 and 2. The Unit 1 strainer was increased from the original 135 square feet to approximately 1700 square feet. Unit 2's strainer has been increased from the original 135 square feet to approximately 1000 square feet. During the Spring 2008 refueling outage, an expansion of about 700 square feet will be added to the Unit 2 ECCS Sump Strainer, bringing the total strainer surface area to approximately 1700 square feet. In addition to providing a significant increase in strainer surface

area, the new design in both Units incorporates a reduction in strainer hole size from 0.206 inch nominal (original strainer) to less than 0.094 inch nominal (new strainer).

The baseline evaluation for McGuire's Unit 1 and 2 modified ECCS Sump Strainers determined that, if Microtherm® insulation located on the reactor vessel heads was removed, 1000 square feet of strainer area would accommodate the baseline debris load. The McGuire modified strainer designs were expanded to approximately 1700 square feet, which is the largest practical installation in the existing Unit 1 and Unit 2 lower containment area (accounting for strainer submergence requirements). This expanded strainer area was intended to provide margin for issues that have not been resolved in the industry.

Testing

McGuire is an ice condenser plant using a sodium tetraborate buffer, and as such has a post-LOCA environment that is most similar to the industry-generated Integrated Chemical Effects Test (ICET) 5. ICET 5 documented that no significant chemical precipitates were observed in a sodium borate environment.

Integrated Chemical Effects Test ICET-5-1-B2_042606, conducted as a follow-on to the ICET 5 testing, showed that no significant pressure drop occurred in a sodium borate environment until the aluminum concentration was increased to 100 ppm. An aluminum concentration of 50 ppm produced no significant head loss during approximately 11 days of testing with a sodium tetraborate buffer. At McGuire, the highest aluminum concentration predicted is less than 5 ppm (assuming Minimum Safeguards temperatures and minimum containment sump volume to conservatively model the environment).

Testing with a Vertical Test Loop (VTL) has been performed by Duke since June 2006 to gain insight into the behavior of various aluminum chemical species and their effect on pressure drop across a fiber insulation bed deposited on a representative strainer. VTL concentrations of both silica and aluminum were considerably higher than the predicted concentrations. The recently concluded VTL tests, with introduced dissolved aluminum, indicate that dissolved aluminum results in little or no pressure drop increase across the strainer with the representative fiber load and the expected aluminum concentrations for McGuire.

The insights gained from the VTL were used to develop test parameters for the IPT, which will be the integrated chemical effects test of record for McGuire.

Duke's vendor is performing a comprehensive IPT, utilizing a representative ECCS sump pool chemistry and a refined debris loading model for McGuire, along with one prototype of the strainer module (top-hat). Duke has determined that this IPT will sufficiently model the post-accident scenario and anticipates that test results will demonstrate sump strainer margin for NPSH consideration.

Basis for the Proposed Extension

SECY-06-0078, "Status of Resolution of GSI-191, "Assessment of [Effect of] Debris Accumulation on PWR Sump Performance," dated March 31, 2006, specifies two criteria for short duration GL 2004-02 extensions, limited to several months, and a third criteria for extensions beyond several months. McGuire's response to each of these three criteria is provided below.

SECY-06-0078 Criterion 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.*

There are two (2) outstanding technical issues related to the extension request:

1. Completion and evaluation of Duke's Integrated Prototype Test,
2. Incorporation of the IPT results and refinements into the head loss certification calculations and documentation of the IPT inputs.

Completion and Evaluation of Duke's Integrated Prototype Test:

The IPT for McGuire is being conducted on one prototype strainer assembly module (top-hat) using a representative ECCS sump pool chemistry, postulated strainer debris loading and injection of dissolved aluminum.

Originally postulated strainer debris loading has been refined through a reduction in the assumed ZOI in order to provide a more realistic input into the IPT. These refinements will be incorporated into the supporting analyses prior to the completion of the head loss certification calculation.

The IPT will be conducted by Duke's vendor over a 30 day period, and began in October, 2007. This schedule should provide preliminary results by December 31, 2007. Full evaluation and documentation of test results will be completed in order to support a final response to GL 2004-02 on April 30, 2008.

Incorporation of the IPT results into the head loss certification calculations, and documentation of the IPT inputs:

Calculations will be updated to incorporate the results from the IPT, and the supporting analyses and certifications will be revised as well. The formal sump strainer head loss certification consists of several parts (i.e., top-hat assembly head loss, water box/plenum head loss, and chemical effects contribution), and will incorporate the IPT results.

SECY-06-0078 Criterion 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 extended period.*

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

Mitigative Measures

A. ECCS Design

McGuire has installed new modular ECCS Sump Strainers in Units 1 and 2. The Unit 1 strainer was increased from the original 135 square feet to approximately 1700 square feet. Unit 2's strainer has been increased from the original 135 square feet to approximately 1000 square feet. During the Spring 2008 refueling outage, an expansion of about 700 square feet will be added to the Unit 2 ECCS Sump Strainer, bringing the total strainer surface area to approximately 1700 square feet. In addition to providing a significant increase in strainer surface area, the new design in both Units incorporates a reduction in strainer hole size from 0.206 inch nominal (original strainer) to less than 0.094 inch nominal (new strainer).

In addition, the design and placement of the ECCS Sump Strainer Assembly in the Containment Building provides for the filtration of large debris entrained in the sump pool prior to reaching the strainer via passage of water through openings in the crane wall (credited) for those portions of the strainer located outside the crane wall, or through 3/32 inch openings in the strainer enclosure (not credited) for that portion of the strainer located inside the crane wall. A complete description of the modified ECCS Sump Strainer Assembly may be found in Duke's letters of March 8, 27 and April 13, 2007.

B. CSS Design:

In response to NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized Water Reactors," McGuire has the option of manually starting one air return fan at a containment pressure of 1 psig during certain small break LOCA (SBLOCA) transient events (NRC Safety Evaluation Report dated September 25, 2006). This is an additional manual operator action to prevent or delay reaching the initiation pressure setpoint for

containment spray, and reduces the likelihood of operating in the ECCS sump recirculation mode with the associated sump screen debris buildup.

Compensatory Measures

A. Microtherm® Insulation Replacement

The Microtherm® insulation previously installed on the Unit 1 and Unit 2 reactor vessel heads has been removed and replaced with reflective metal insulation. Test data demonstrated that Micro-porous insulation debris, combined with other fiber debris, created a debris bed that caused relatively high head losses.

B. Programmatic Controls to Reduce Debris in Containment

McGuire has several programmatic controls in place to ensure that potential sources of debris that may be 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. Typical programmatic controls are described below:

1. Coating Program

As described by Duke's November 11, 1998 response to GL 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 Duke applied 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 Attachment 1 to the November 11, 1998 letter, 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 enhancements to McGuire's containment cleanliness programs. These actions have been implemented and provide for containment cleaning and visual inspections.

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

The plant labeling process has been enhanced to require that any additional labels or signs placed inside containment be evaluated to ensure that the design basis for transportable debris is not invalidated.

McGuire Technical Specification Surveillance Requirement (SR) 3.5.2.8 requires that the ECCS sump be visually inspected to verify there are no restrictions as a result of debris, and no evidence of structural distress or abnormal corrosion present prior to declaring the ECCS sump operable. A visual inspection of containment is performed to ensure no loose material is present which could be transported to the Containment Sump and cause restriction of the ECCS pump suction during accident conditions prior to the transition from Mode 5 to Mode 4 operations. When these inspections are performed, major outage work is complete, and any remaining loose material in containment must be logged and tracked in accordance with station procedures for control and accountability. If any debris, damage or deficiency were to be discovered during the inspection, station processes require entry into the corrective action program, with the requisite investigation and implementation of appropriate corrective action prior to the transition from Mode 5 to Mode 4.

3. Modification Process

Duke's modification process currently includes an administrative procedure that directs the design and implementation of engineering changes in 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.

C. Operator Actions and Training

Duke's May 27, 2004 response to NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors," committed to the following actions recommended by WCAP-16204 in order to reduce the risk associated with potential containment emergency sump blockage during ECCS and Containment Spray recirculation functions:

- Initiation of 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.

In addition to the above, Duke implemented a procedure change which relocated the step to shut down a containment spray pump when it is no longer required to mitigate the event. This step now occurs earlier in the procedure.

These actions have been completed and appropriate operator training conducted. The actions taken to address each of the above listed items are documented in the Duke corrective action program.

SECY-06-0078 Criterion 3: *For proposed extensions beyond several months, a licensee's request will more likely be accepted if the proposed mitigative measures include temporary physical improvements to the ECCS sump or materials inside containment to better ensure a high level of ECS sump performance.*

Physical mitigative measures put in place in McGuire Units 1 and 2 are described in detail in response to Criterion 2 of this extension request. These measures are not temporary; all physical corrective actions to date are significant permanent changes to the plant taken to address the issues identified in GSI 191. All physical mitigative measures (i.e., the second phase of the modification to Unit 2's ECCS Sump Strainer) will be completed during the McGuire Unit 2 Spring 2008 refueling outage.

Risk Assessment

McGuire Unit 1 has completed the planned ECCS Sump Strainer modifications and Unit 2 will implement the second phase during the spring 2008 refueling outage. A total of approximately 1700 square feet of strainer surface area per Unit will be available for containment sump debris.

The final ECCS Sump Strainer design has been sized to accommodate the maximum transportable debris (fibrous insulation, dirt, paint chips and other particulates, and latent debris) from the limiting break location. A very conservative initial approach has been used regarding selection of the fiber insulation ZOI to obtain the debris generation volume. The strainers have been sized and initially tested to accommodate this debris load, and show adequate NPSH margin.

Extensive in-house and industry testing representative of McGuire has been performed. Insights from actual chemical effects tests done to date:

- Integrated Chemical Effects Test ICET 5 concluded that no significant chemical precipitates were observed in a sodium borate environment. In addition, Integrated Chemical Effects Test ICET-5-1-B2_042606 showed that no significant pressure drop resulted in a sodium borate environment until the aluminum concentration was increased to 100 ppm. An aluminum concentration of 50 ppm produced no significant head loss during approximately 11 days of testing with a sodium tetraborate buffer. At McGuire, the highest aluminum concentration predicted is less than 5 ppm (assuming Minimum Safeguards temperatures and minimum containment sump volume). The assumption of Minimum Safeguards conditions (i.e., one train CSS operation) and minimum containment sump pool volume results in higher and thus more conservative aluminum precipitate concentrations.

- In-house tests conducted on Duke's vertical test loop indicate that aluminum will stay in solution and no significant precipitates will occur at the concentrations expected in the McGuire post-accident ECCS sump. Significant increases in head loss due to precipitates are not anticipated based on these tests.

Therefore, the chemical effects, as determined by the pending Integrated Prototype Test, are not expected to have an impact on ECCS Sump Strainer failure probability.

In conclusion, the ECCS Sump Strainers have been designed for more than the expected debris loading, and chemical effects are not expected to have a significant impact on ECCS Sump Strainer performance. There is no change to the Core Damage Frequency beyond that identified in the Duke Request for Extension dated February 9, 2007 of less than 1 E-6.

Conclusion

An extension of the McGuire Unit 1 and Unit 2 dates for the completion of all corrective actions required by GL 2004-02 is acceptable due to the fact that:

- Duke has taken action, including in-house analysis and testing, and has implemented physical improvements (including transportable insulation reduction and the installation of larger ECCS Sump Strainers) to ensure a high level of ECCS sump performance,

- McGuire has put in place permanent mitigative and compensatory measures to minimize the risk of degraded ECCS/CSS functions during the requested period of extension,

- Duke's Integrated Prototype Test (chemical effects) is designed to provide a representative post-accident sump environment and sump strainer challenge for the McGuire Units, and

- Insights gained from Duke's previous in-house chemical effects testing provide high confidence that the Integrated Prototype Test will yield acceptable NPSH margin on the modified ECCS Sump Strainer Assembly.

The requested 4 month period of this extension is required to allow the Integrated Prototype Test results, which will be available in preliminary form by the Fall of 2007, to be evaluated, documented and reviewed. The IPT results will then be incorporated into the formal head loss certification calculation for McGuire Units 1 and 2. The formal sump strainer head loss certification consists of several parts (i.e., top-hat assembly head loss, water box/plenum head loss, and chemical effects contribution), which will be revised after the IPT results are documented. Internal procedures to appropriately process this information, and to assure the quality of that information and the associated regulatory submittals, are also necessarily rigorous.

Additionally, the McGuire Unit 2 ECCS Sump Strainer modifications will be completed during this 4 month period. Given these factors, and the fact that Duke

endeavors to provide an accurate and complete response commensurate with the significance of GSI 191, a 4 month extension is prudent.

TABLE 1
STATUS OF 2004-02 CORRECTIVE ACTIONS

Item Description	Status
A baseline evaluation has been performed for McGuire by Enercon Services, Inc. This evaluation was performed using the guidance of NEI 04-07.	Complete
A refined evaluation using the guidance of NEI 04-07 will be completed for McGuire by Enercon Services, Inc. This evaluation will provide plant specific refinements to the baseline evaluation that can be justified for McGuire. This evaluation is expected to provide additional head loss margin for the containment sump.	Complete
A downstream effects evaluation will be completed for McGuire by Enercon Services, Inc. This evaluation will be performed using the methodology provided by WCAP-16406-P, Rev 0: "Evaluation of Downstream Sump Debris Effects in Support of GSI 191." Any additional plant modifications or procedure changes associated with this evaluation will be completed by December 31, 2007.	Complete
Chemical effects will be evaluated to confirm that sufficient margin exists in the final sump design to account for any associated head loss. Any additional plant modifications or procedure changes associated with this evaluation will be completed by Dec 31, 2007.	Conclusive Integrated Prototype Test results may not be available from the vendor in sufficient time to allow for incorporation into the refined McGuire sump strainer analyses. McGuire will provide all available information in its December 31, 2007 supplemental response.
Downstream chemical effects are under investigation by the industry with the intent of addressing this issue by Dec 31, 2007.	Duke is investigating downstream chemical effects with the intent of addressing this issue by Dec 31, 2007

Item Description	Status
A confirmatory walkdown of containment using the guidance of NEI 02-01, "Condition Assessment Guidelines: Debris Sources Inside PWR Containments" (NEI 02-07) was completed for McGuire Units 1 and 2.	Complete
A confirmation of the conservatism of the 200 pound latent debris assumption used in the baseline analysis will be performed by latent debris survey sampling during the McGuire Unit 1 Fall refueling outage in 2005.	Complete
The plant labeling process will be enhanced to require that any additional labels or signs placed inside containment are evaluated to ensure that the design basis for transportable debris is not invalidated.	Complete
Testing [Integrated Prototype Test] will be performed to confirm that the replacement strainer head loss is acceptable under design basis debris load conditions.	30 day test began October, 2007
A modified containment sump strainer and supporting structure will be completed in the Spring of 2008 for McGuire Unit 2 and in the Spring of 2007 for McGuire Unit 1.	Unit 1 Complete. Unit 2, Phase 1 Complete, Phase 2 pending and on schedule
Replacement of the Microtherm® insulation (currently installed on portions of the reactor vessel heads) will be completed in the Fall of 2006 for McGuire Unit 2 and in the Spring of 2007 for McGuire Unit 1. The replacement of this insulation will reduce the postulated post-accident debris loading on the sump strainer.	Complete
Duke will evaluate the modification process to determine if additional controls are needed in order to maintain the validity of inputs to analyses performed in resolving GSI-191 concerns.	Complete

Enclosure 2

List of Regulatory Commitments

REGULATORY COMMITMENTS:

The following table identifies those actions committed to by McGuire in this document. Any other statements made in this licensing submittal are provided for informational purposes only and are not considered to be regulatory commitments. Please direct any questions you may have in this matter to K. L. Ashe at (704) 875-4535.

REGULATORY COMMITMENTS	Due Date
Duke will provide a supplemental response to GL 2004-02 (including the RAIs)	December 31, 2007
Any additional or revised information resulting from the IPT evaluation will be provided as an amended response to GL 2004-02	April 30, 2008