

October 31, 2007

Mr. J. R. Morris
Site Vice President
Catawba Nuclear Station
Duke Power Company LLC
4800 Concord Road
York, SC 29745

SUBJECT: CATAWBA NUCLEAR STATION, UNIT 1 (CATAWBA UNIT 1), ISSUANCE OF AMENDMENT REGARDING EXTENSION OF TIME LIMIT TO COMPLETE EMERGENCY CORE COOLING SYSTEMS SUMP MODIFICATION (TAC NOS. MD3443 AND MD3777)

Dear Mr. Morris:

The Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 237 to Renewed Facility Operating License NPF-35 for Catawba, Unit 1. The amendment consists of changes to the operating license in response to your application dated November 22, 2006.

The amendment revises the Catawba Unit 1 Facility Operating License (FOL) to add a license condition requiring a specific date by which the modifications to the Emergency Core Cooling Systems (ECCS) sump in response to 2004 Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors." The changes add a license condition which requires that 1) Catawba Unit 1 will enter Mode 5 for the outage to install the sump strainer modification no later than May 19, 2008, and that 2) the Unit 1 sump strainer modification will be completed prior to entry into Mode 4 after May 19, 2008.

By letter dated November 1, 2006, the licensee requested an extension to the December 31, 2007, completion deadline for modification associated with GL 2004-02. The NRC staff has reviewed the licensee's justification for the extension and determined that it is acceptable to extend the completion date for the passive strainer installation for Catawba Unit 1 until May 19, 2008.

J. Morris

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A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

John Stang, Senior Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-413

Enclosures:

1. Amendment No. 237 to NPF-35
2. Safety Evaluation

cc w/encls: See next page

J. Morris

-2-

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DUKE POWER COMPANY LLC
NORTH CAROLINA ELECTRIC MEMBERSHIP CORPORATION
SALUDA RIVER ELECTRIC COOPERATIVE, INC.
DOCKET NO. 50-413
CATAWBA NUCLEAR STATION, UNIT 1
AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 237
Renewed License No. NPF-35

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the Catawba Nuclear Station, Unit 1 (the facility) Renewed Facility Operating License No. NPF-35 filed by the Duke Power Company LLC, acting for itself, North Carolina Electric Membership Corporation and Saluda River Electric Cooperative, Inc. (licensees), dated November 22, 2006, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, Renewed Facility Operating License No. NPF-52 is hereby amended as indicated in the attachment hereto.
3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Evangelos C. Marinos, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to Renewed Facility
Operating License No. NPF-35

Date of Issuance: October 31, 2007

ATTACHMENT TO LICENSE AMENDMENT NO. 237
RENEWED FACILITY OPERATING LICENSE NO. NPF-35
DOCKET NO. 50-413

Replace the following pages of the Renewed Facility Operating License and the Appendix B, Additional Conditions with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

Insert

License Pages

License Pages

NPF-35 page 4

NPF-35 page 4

NPF-35 page 5

NPF-35 page 5

Appendix B page 2

Appendix B page 2

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO

AMENDMENT NO. 237 TO RENEWED FACILITY OPERATING LICENSE NPF-35

DUKE POWER COMPANY LLC

CATAWBA NUCLEAR STATION, UNIT 1

DOCKET NO. 50-413

1.0 INTRODUCTION

By letter dated September 1, 2005 response (Agencywide Documents Access and Management System (ADAMS) Accession No. ML052500399) to 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, (the licensee) committed to install a new approximately 2000 square foot surface area containment sump strainer in Catawba Nuclear Station, Unit 1 (Catawba Unit 1), during its fall 2006 refueling outage. Due to a delay in the completion of the final design of the sump strainer modification for Unit 1 and materials needed for prefabrication and mock-up work for the modification were significantly behind schedule, the licensee by letter dated November 1, 2006 (ADAMS ML063110609), requested an extension to delay the installation of the new containment sump strainer in Unit 1 until the refueling outage scheduled to begin May 19, 2008. In the November 1, 2006, letter, the licensee committed to submit for review and approval additional license conditions to require the above modifications to be completed prior to entry into Mode 4 after May 19, 2008. By application dated November 22, 2006 (ADAMS ML063420125), the licensee requested the additional conditions be added to the Catawba Unit 1 Facility Operating License (FOL).

The proposed changes would revise the Catawba Unit 1 FOL to provide for an extension of the time limit to complete the required modification to the Emergency Core Cooling System (ECCS) sump per GL 2004-02, "Potential Impact of Debris Blockage on Emergency Re-circulation Design Basis Accidents at Pressurized Water Reactors." The changes would add a license condition which requires 1) Unit 1 to enter Mode 5 for the outage to install the sump strainer modification no later than May 19, 2008, and 2) the Unit 1 sump strainer modification to be completed prior to entry into Mode 4 after May 19, 2008.

2.0 REGULATORY EVALUATION

GL 2004-02, is part of the regulatory framework the NRC staff is using to address issues associated with Generic Safety Issue (GSI) 191, "Assessment of Debris Accumulation on PWR [Pressurized Water Reactor] Sump Performance," to improve evaluation of plant capability to meet Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.46(b)(5), "Long-term cooling." Section 50.46(b)(5) requires licensees to design their ECCS systems with capability for long-term cooling. After a successful system initiation, the ECCS must be able to provide cooling to maintain the core temperature at an acceptably low value for a sufficient duration.

GSI-191 concerns the possibility that debris generated by a loss-of-coolant accident (LOCA) could accumulate on the ECCS sump screen, resulting in a loss of net positive suction head margin. Debris passing through the screen may degrade downstream components such as pumps, valves, and heat exchangers or plug or restrict heat exchanger or fuel flow channels. These phenomena may prevent the ECCS from meeting the criteria of Section 50.46 of Title 10 of the *Code of Federal Regulations*, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors."

The GL requested all pressurized water reactor (PWR) licensees (1) to use an NRC-approved methodology to perform a mechanistic evaluation of the potential for post-accident debris blockage and operation with debris-laden fluids to impede or prevent the recirculation functions of ECCS and CSS following all postulated accidents for which these recirculation functions are required, and (2) to implement plant modifications or other corrective actions which the evaluation identifies as necessary to ensure system functionality by December 31, 2007.

SECY-16-0078, "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 the resolution of GSI-191. It states:

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 NRC 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.

3.0 TECHNICAL EVALUATION

The licensee stated that there was a delay in the completion of the final design of the sump strainer modification for Catawba Unit 1 largely due to issues related to the final design of the

strainer trash racks. Further, materials for pre-fabrication and mock-up work for the modification were significantly behind schedule.

The licensee therefore proposed in its November 1, 2006, extension request letter, for the fall 2006 Catawba Unit 1 refueling outage, to only tear down and re-route interfering piping and hangers to support efficient strainer installation in the next outage, and to take precise measurement in containment to facilitate installation mounting/support parts fabrication. Due to strainer component delivery delay, installation mock-up training has been severely limited.

The licensee stated that the vertical trash rack associated with the strainer vortex suppressor design may impact the ability of the strainer to perform its design function in that a significant pressure drop may occur across the integral trash rack. Further, the licensee believes that the current strainer design with integral trash rack does not meet all the existing detailed requirements outlined in Regulatory Guide 1.82, Rev. 0. Also, the large volume enclosed by the trash rack may cause difficulty in accessing several plant components normally used during outages. By letter dated March 29, 2007 (ADAMS Accession No. ML071020044), the licensee submitted a license amendment request (LAR) which requested approval of the removal of the trash rack requirement.

The licensee stated that it may be able to reduce the estimated 100 REM ALARA strainer installation penalty through flushing and chemical cleaning processes if the project is implemented in the spring 2008 outage.

The licensee stated that it plans a number of modifications during the fall 2006 outage to address GSI-191 issues:

- Replacement of NUKON fiberglass blankets from the bottom bowls of the Catawba Unit 1 steam generators with reflective metal insulation (RMI). This will involve removing 400 cubic feet of fibrous insulation (of which approximately 280 cubic feet are below the maximum flood level in containment). The only remaining fiberglass insulation below the steam generator lateral support will be pads on the reactor coolant loop piping (80 cubic feet per loop).
- Replacement of Microtherm micro-porous fiber on the reactor vessel head flange with RMI.
- Replacement of throttle valve orifice plates with smaller diameter plates to allow emergency core cooling system (ECCS) throttle valves to be opened wider than is currently allowed for flow balancing.

The licensee stated that there are a number of favorable site conditions for Catawba Unit 1:

- Programmatic controls to control design basis accident (DBA) debris
 - Requirements for the identification and repair of qualified coatings, and evaluation, removal and repair of unqualified coatings that may be susceptible to detachment during a DBA.
 - Requirements for containment cleaning. These include extensive cleaning during

outages using water spray, vacuuming and hand wiping, in general limited to lower containment that would be submerged during large-break LOCA conditions, with localized washdowns elsewhere as needed. Visual inspections are performed on the remaining areas of containment, and foreign materials are removed as necessary. Material accountability logs are maintained in Modes 1 through 4 for items carried into and out of containment.

- Operator actions and training in response to Nuclear Regulatory Commission (NRC) Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors," and recommendations made by the industry in WCAP-16204, "Evaluation of Potential ERG [Emergency Response Guideline] and EPG [Emergency Procedure Guideline] Changes to Address NRC Bulletin 2003-01 Recommendations":
 - Initiation of refueling water storage tank makeup following transfer to recirculation from the containment emergency sump;
 - Earlier shutdown of a containment spray pump when no longer needed to mitigate an event;
 - Operator training on Bulletin 2003-01 ECCS sump clogging operating experience and procedural enhancement;
 - Development of an operator response procedure providing guidance on actions to be taken should both trains of ECCS and containment spray be affected by containment sump blockage;
 - An approved license amendment in response to GL 2004-02 allowing operators to manually start a containment air return fan early during certain small break LOCA events to mitigate the effects of debris accumulation in the containment sump.
- Conservative assumptions relating to fibrous debris generation due to postulated pipe ruptures:
 - Pipe restraints exist at debris generation limiting break locations;
 - Double ended guillotine breaks for high energy line breaks which adversely affect lower containment are physically impossible due to pipe restraints;
- Inspections and modifications of the reactor coolant system boundary:
 - Weld overlays on pressurizer nozzle connections during the fall 2006 outage;
 - A volumetric inspection of the reactor vessel head penetrations in the fall 2006 outage;

- A 100 % bare metal visual inspection of the 58 bottom-mounted reactor coolant system instrumentation penetrations during the fall 2006 outage;
- A 100% bare metal visual inspection of the 78 pressurizer heater penetrations during the fall 2006 outage; and
- Walkdowns and American Society of Mechanical Engineers Section XI pressure test to ensure continued integrity of the reactor coolant system.

The licensee has performed a probabilistic risk assessment (PRA) to specifically address the impact of extending the time for implementing the final sump strainer modification until the May 2008 refueling outage (a 140-day extension from the December 31, 2007). The licensee discussed the PRA methodology and various conservatisms in the PRA (e.g., no credit for the actual emergency coolant and containment spray pump net-positive suction head margin which would exist during a LOCA event). The licensee stated that the PRA demonstrated that the core damage frequency risk associated with extending the modification schedule by 140 days is less than or equal to 1E-6.

The NRC staff has reviewed the PRA results and finds that based on the above the licensee's actions will provide acceptable strainer function with adequate margin for uncertainties for the 140-day extension time. Further, the NRC staff has concluded that the licensee has put mitigation measures in place to adequately reduce the risk for the requested short extension period. Therefore, the NRC staff finds it acceptable to extend the completion date for the corrective actions for the issues discussed in GL 2004-02 until the completion of the Catawba Unit 1 spring 2008 refueling outage, currently scheduled to begin on May 19, 2008. The new license conditions assure that Catawba Unit 1 will shut down May 19, 2008, and will not restart until all modifications being made for GL 2004-02 have been completed.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the South Carolina State official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts and no significant change in the types of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (72 FR 11386). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Leon Whitney

Date: October 31, 2007