

February 17, 2007

MEMORANDUM TO: Melvin C. Shannon, Senior Resident Inspector
Branch 1
Division of Reactor Projects
Region II

FROM: J. E. Dyer, Director/**RA**
Office of Nuclear Reactor Regulation

SUBJECT: DIFFERING PROFESSIONAL OPINION DECISION REGARDING
USE OF LEAK-BEFORE-BREAK TECHNOLOGY INVOLVING
RECIRCULATION SUMP STRAINERS AT OCONEE, UNITS 1 AND 2
(DPO-2006-002)

The purpose of this memorandum is to provide the management decision for the Differing Professional Opinion (DPO) regarding the use of leak-before-break (LBB) technology in the design of a facility modification involving installation of new emergency core cooling system (ECCS) recirculation sump strainers at Oconee, Units 1 and 2, that you submitted on May 3, 2006. In accordance with Management Directive 10.159, "The Differing Professional Opinions Program," I appointed an Ad Hoc Review Panel on June 2, 2006 to conduct an independent review of your concerns. The panel met with you on July 20, 2006 to obtain clarification on certain details of your concerns and you confirmed the panel's summary of the issues.

I understand the background associated with this issue is as follows:

On August 18, 2005 and supplemented on September 15, 2005, Duke Energy Corporation ("the licensee") submitted a request to modify Oconee Nuclear Station, Units 1 and 2 Technical Specifications (TS) 3.5.2.6 and 3.5.3.6. The requested changes to TS 3.5.2.6 and 3.5.3.6 were related to replacement of the reactor building emergency sump suction inlet trash racks and screens with new sump strainers. The licensee planned to install the new ECCS sump strainers to address issues raised in Generic Safety Issue-191 (GSI-191), "Assessment of Debris Accumulation on Pressurized Water Reactor Sump Pump Performance," and requests made in Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors." In response to GL 2004-02, the licensee provided an engineering evaluation by Stone and Webster (Calculation S-003) to assess the impact of pipe rupture and jet impingement on the design function of the new sump strainers and determine if additional protection, i.e. jet impingement shields, were necessary. Calculation S-003 concluded that the design function of the sump strainers would not be compromised by jet impingement or pipe whip from any lines in the vicinity of the emergency sump. For the reactor coolant

CONTACT: Tilda Y. Liu, NRR
415-1315

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system (RCS) cold leg, this conclusion was based on crediting LBB technology. In a safety evaluation dated November 1, 2005, the NRC concurred with the conclusions of the licensee's engineering evaluation and issued Amendments 348 and 350 to modify the technical specifications necessitated by installation the of ECCS sump strainers in Oconee Nuclear Stations, Units 1 and 2.

The panel reviewed and described your concerns as follows:

The fundamental contention is that the ECCS sump strainer modification should not have been approved by the NRC nor implemented by the licensee. The submitter indicated that the new ECCS sump strainers at Oconee Units 1 and 2 can be adversely impacted by the dynamic effects of jet impingement from a potential RCS cold leg loss of coolant accident (LOCA) in a way that could disable the ECCS re-circulation function. In approving the installation, the staff allowed dynamic effects to be excluded from the design bases for the strainers based on LBB technology. The submitter expressed that LBB technology should not have been credited by staff because the licensee has not submitted the information required to justify the application of LBB technology for NRC review and approval. The submitter also indicated that even if the required information is submitted, the staff should not permit the application of LBB technology because the NRC does not allow the use LBB technology to exclude dynamic effects such as jet impingement when those effects adversely impact the ECCS or containment.

The DPO resulted in part from the interpretation of Commission policy that LBB technology cannot be used if the dynamic effects of the pipe rupture adversely affect ECCS and containment. In support of this position, this DPO cited sections from the final rule that modified GDC-4 to permit exclusion of dynamic effects of high energy pipe ruptures from the design basis of systems, structures and components (SSC) based on LBB technology (52 FR 41288, October 27, 1987). Since then, the NRC has accepted the concept of LBB for certain large diameter high-quality piping systems such as the RCS cold leg line, thereby, permitting the removal, or non-installation, of various pipe-whip restraint devices and jet-impingement shields originally designed to mitigate the dynamic effects of a postulated instantaneous pipe rupture.

During the review, the panel noted that the central issue raised in this DPO had not been effectively resolved through normal interactions between the two division management teams in the Regional Office and NRR, or via an established NRR process for resolving questions on the application of Commission's regulations, such as the Task Interface Agreement (TIA) process.

The panel provided the results of its review in a report dated November 13, 2006 which you were provided a copy. The panel reached the following overall conclusions:

- The concern regarding inappropriate application of LBB technology in the ECCS recirculation sump strainer modification at Oconee, Units 1 and 2, was based on an incorrect understanding of the Commission's regulations and policy on the use of LBB technology in the design of the ECCS. The regulations and policy support the staff's decision to authorize the application of LBB technology to this modification.

- The staff reviewed and documented the approval of the application of LBB technology for reactor coolant system cold leg breaks that could affect the ECCS recirculation sump strainer for Oconee, Units 1 and 2, pursuant to the draft Standard Review Plan 3.6.3, "Leak-Before-Break Evaluation."

In reaching my decision, I reviewed the panel's report and discussed the report with the panel chair. I understand that you did not have any comments with regards to the panel's report issued on November 13, 2006. Based on these reviews, I agree with the conclusions of the panel. The panel provided one recommendation. My decision regarding its recommendation, and the rationale for the decision, is provided below.

RECOMMENDATION: The staff should develop a knowledge management document describing the NRC's policy and practice on the application of LBB.

Decision: Agree with the recommendation. The staff will review its existing documents and enhance the understanding on the application of LBB by developing a knowledge management document as appropriate.

Rationale: This DPO issue demonstrated that the application of LBB technology involves many regulatory developments over time and may not be apparent and easily understood. A knowledge management document that would clearly restate and present all the background and developments to the application LBB technology would enhance the effectiveness and efficiency on the part of the staff and the inspectors as they perform technical reviews and inspections related to the LBB issues.

I would like to express my appreciation to you for having first brought your concerns up through your first and second line supervisors. I commend your willingness to subsequently use the DPO Program in raising your concerns. Your willingness to bring your concerns first to your management's attention, and then to mine through the DPO process, contributed to the development of the recommendation for an enhancement to the NRR mission. In accordance with Management Directive 10.159, "The Differing Professional Opinions Program," a summary of the issue and its disposition will be included in the Weekly Information Report to advise interested employees of the outcome.

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W. Kane, OEDO
J. Grobe, NRR

R. Pedersen, DPOPM
M. Caruso, NRR

M. Weber, NRR
A. Csontos, RES

T. Liu, NRR

Adams Accession Number: ML070440171

OFFICE	NRR/TA	NRR/OD
NAME	T. Liu	J. Dyer
DATE	2/16/07	2/17 /07

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