August 3, 2004

MEMORANDUM TO: Cathy Haney, Program Director
Policy and Rulemaking Program
Division of Regulatory Improvement Programs, NRR

FROM: Joseph L. Birmingham, Project Manager ***/RA/***
Policy and Rulemaking Program
Division of Regulatory Improvement Programs, NRR

SUBJECT: SUMMARY OF JULY 19, 2004, TELECONFERENCE WITH INDUSTRY AND THE MATERIALS RELIABILITY PROJECT ON SAFETY ASSESSMENT FOR BOTTOM MOUNTED NOZZLES

On July 19, 2004, Nuclear Regulatory Commission (NRC) staff held a teleconference with representatives of the Electrical Power Research Institute (EPRI) Material Reliability Project (MRP), the Nuclear Energy Institute (NEI), and industry. In this teleconference, the industry presented a status of its development of a safety assessment and recommendations for the detection and control of leakage and corrosion of the bottom reactor vessel head and nozzle penetration areas. The slides provided by industry are in ADAMS under accession number ML042020010. Attachment 1 is a list of staff suggestions to the MRP to consider for inclusion in the safety assessment. Attachment 2 is a list of the teleconference participants.

After introductions, industry presented information on the bottom mounted nozzle (BMN) nondestructive examination (NDE) demonstration program, the BMN safety assessment plan, the integrated inspection plan, and the BMN strategic plan. In general, industry reported that the elements of the BMN safety assessment were proceeding on schedule. Industry reported it was continuing to develop the elements of the safety assessment plan for BMN and provided details of the ongoing efforts of the Westinghouse and the Babcock and Wilcox Owners Groups. Industry presented a list of plants that plan to conduct BMN volumetric examinations during upcoming outages through the Spring of 2005 outage season. The plants listed represent a variety of vendor and vessel types. Regarding BMN repair techniques, industry indicated that commercial techniques were available and it was not necessary to develop new techniques. Industry summarized the results of the BMN inspections performed at the Callaway Nuclear Plant. The inspections performed at Callaway included visual, eddy current, and ultrasonic examinations. No indications were noted by these inspections. The EPRI MRP expected to have its final BMN inspection strategy and the final BMN safety assessment complete in the Spring of 2006.

During the industry presentation, the staff asked questions and made suggestions on actions for industry consideration. The staff asked questions about the types and sizes of the flaws included in the NDE demonstration mockups. The staff specifically asked whether the NDE demonstration included lack of fusion (LOF) reflectors and observed that LOF was reported in the inspection results for the South Texas Project Nuclear Plant, Unit 1. The staff observed that the role of LOF in the root cause assessment for the cracked penetrations at South Texas makes it important that LOF reflectors be included in the demonstration mockups. The staff

asked if the ultrasonic examinations included looking for flaws at tube-to-weld and weld-to-butter locations. The staff asked several questions regarding the risk evaluation of a potential nozzle break and made suggestions to consider for that evaluation. Regarding the schedule for volumetric examinations at plants during upcoming outages, the staff asked that industry provide consolidated feedback on the examination results as the groups of outage examinations were completed. Industry thought a general summary of results could be provided as the examinations were completed. A summary of the staff's suggestions is attached to this memorandum.

Having concluded the presentation and discussed the staff's questions, the teleconference was ended.

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Staff Suggestions on BMN Safety Assessment

1. Regarding the BMN demonstration mockups, the staff questioned whether the program includes any lack of fusion (LOF) reflectors throughout the weld. The staff recommended that the MRP consider adding LOF in the blind demonstration mockups to demonstrate the ability of the techniques being used for BMN examinations to detect LOF. The staff noted that since LOF was determined to be a contributing factor in the occurrence of primary water stress corrosion cracking (PWSCC) in two BMNs at South Texas, Unit 1, it was important for licensees performing volumetric examinations of BMNs to use techniques that have been demonstrated capable of detecting this condition. The MRP representatives agreed to take this issue under consideration. In the interim until the MRP decides whether it will augments the blind mockups to include LOF, the staff recommended that licensees performing the BMN examinations include a probe that has been successfully demonstrated to detect LOF, such as a 0 degree longitudinal wave probe. This type of probe was used in the examinations performed at South Texas, Unit 1.

2. Regarding the risk evaluation of a potential nozzle break, the staff suggested that the evaluation include (1) a reassessment of the human error probabilities associated with use of the emergency operating procedures to account for the location of the break on the lower head, below the level of the fuel, and (2) specification of a process for eventually terminating the operation of the ECCS in the recirculation mode and an assessment of the risk associated with this recovery process, as well as the risk of the long-term recirculation. The staff also inquired whether the recovery process would be hampered by the potential for the highly radioactive thimble tube and in-core detector to be ejected into the space below the reactor vessel. The MRP indicated it would look into these questions.

3. The staff discussed how it would be informed of the results of BMN volumetricand surface examinations planned to be performed at a number of sites during the Fall of 2004 and the Spring of 2005. Two approaches were noted. The staff can request individual calls with each licensee performing an inspection. The staff also suggested that a meeting or telecon with the MRP each outage season could be used as a forum for transmitting examination summary results. The staff noted that if any BMN indications are found, it expects that it would be promptly informed by the licensee and its resident inspector. The MRP indicated that it would consider providing examination summary results to the NRC staff each outage season through either a scheduled meeting or a telecon.

4. The staff discussed the types of flaws for demonstration of visual examination techniques. The three types of flaws mentioned were Electrical Discharged Machine (EDM) notches, squeezed EDM notches, and cracks. The staff expressed the need for representative crack widths and lengths similar to cracks found in the field. MRP indicated it would consider using cracks for demonstration purposes.

5. The staff discussed performance-based qualifications of personnel and equipment for BMN examinations. The MRP is performing demonstrations on mockups to test volumetric and surface examination methods. These demonstrations are not qualifications. The MRP is cognizant of the need for some kind of qualification based on a performance-based demonstration similar to Appendix VIII. The MRP indicated it has the development of qualification criteria as a future objective.

Attachment 1

Staff Suggestions (Cont.)

6. The staff noted that the June 23, 2003, MRP letter from Leslie Hartz, "Recommendation for PWR Owners with Alloy 600 Bottom Mounted Reactor Vessel Instrument Nozzles," contained recommendations for bare metal visual examinations of BMNs. These recommended examinations will be completed at most plants by the Fall 2004 outage. The staff also noted that the Final BMN Assessment is not scheduled for completion until the Spring of 2006. The staff requested that the MRP consider issuing to the industry a set of preliminary recommendations for ongoing examinations as the existing recommendations will expire before the program is completed.

Attendees for July 19, 2004 Teleconference
RPV Bottom Mounted Nozzles and Penetrations

NAME	ORGANIZATION
Jim Riley	NEI
Bill Gray	AREVA
John Klingenfus	AREVA
David Bajumpaa	Dominion/Millstone
Christine King	EPRI
Larry Matthews	Southern Nuclear
David Whitaker	Duke Energy
Tom Alley	Duke Energy
Christopher E. Morgan	Westinghouse
Mel Arey	Duke Energy
Fred Witzel	Wesdyne
Ted Sullivan	NRC/NRR/EMCB
Don Naujock	NRC/NRR/EMCB
Matt Mitchell	NRC/NRR/EMCB
Steve Monarque	NRC/NRR/EMCB
Cheruvenki Ganesh	NRC/NRR/EMCB
Steve Long	NRC/NRR/DSSA/SPSB
Joseph Birmingham	NRC/NRR/RPRP

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MMitchell
SMonarque
JBirmingham
SLong
TChan
SCoffin
cc: Via email

Christine King, EPRI
CKing@epri.com

Larry Mathews, Southern Co.
Lkmathew@southernco.com

Jim Riley, NEI
jhr@nei.org

ADAMS Accession Number: ML042160490

OFFICE	RPRP	EMCB	RPRP
NAME	JBirmingham	ESullivan	EMcKenna
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