

July 22, 2003

MEMORANDUM TO: Brian E. Thomas, Acting 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 JUNE 12, 2003, MEETING WITH NUCLEAR ENERGY
INSTITUTE (NEI) AND MATERIALS RELIABILITY PROGRAM ON
MATERIALS ISSUES

On June 12, 2003, Nuclear Regulatory Commission (NRC) staff met with representatives of the Nuclear Energy Institute, the Electrical Power Research Institute (EPRI) Materials Reliability Program (MRP) and industry in a public meeting at NRC headquarters in Rockville, Maryland. At this meeting, industry discussed the boric acid residue found on two bottom mounted instrumentation (BMI) nozzles at the South Texas Project (STP) Unit 1, reactor vessel, Alloy 600 butt weld safety assessment, reactor pressure vessel (RPV) safety assessment, RPV head probabilistic fracture mechanics (PFM) analysis, boric acid corrosion (BAC) program, and information on the North Anna head study. Details about each topic may be found in the viewgraphs presented during the meeting. The viewgraphs are listed at the end of this memorandum with their ADAMS Accession Number. The purpose of the meeting was for MRP to present the status of these projects and to provide the staff an opportunity to discuss the projects with the MRP. The meeting attendees are listed in Attachment 1.

After introductions, the MRP discussed the boric acid residue found at STP. The results of visual and volumetric examinations showed crack-like indications in the two BMI nozzles with residue. One leak path (through wall) was found in each nozzle. Similar indications were not found in the other BMI nozzles. The MRP described the results of BMI inspections in industry including inspections from other countries. Based on its findings, the MRP plans to recommend that all plants with BMI perform bare metal visual inspections during future outages. MRP indicated that a non-visual examination may be determined to be necessary as part of a comprehensive inspection plan to evaluate the BMI population. The MRP is continuing to work with industry to develop a strategy to address possible BMI degradation. Additional details of the MRP presentation are in the viewgraphs titled, "Leakage from Bottom Mounted Nozzles at STP," Accession # ML031740114. The NRC commented that it is considering regulatory action regarding visual inspection of BMI nozzles during future refueling outages.

Mr. Mathews, of Southern Nuclear, discussed the status of Alloy 600 butt weld safety assessments. He noted that MRP 44, Part 1, Interim Safety Assessment, issued April 2001, was an interim report and that a final report that responded to NRC comments, incorporated additional information and had an updated risk assessment with final recommendations was scheduled to be issued in 2004. The staff asked the MRP questions about the updated content. The staff and the MRP agreed to meet to discuss the contents of the final report before it is issued. The MRP also stated that it was working with the Owners Groups and the NSSS vendors on the management of Alloy 600 in other locations. The MRP was to identify the work that had already been performed and the work that was still needed. The MRP plans

to continue working with industry and to interact with the NRC on research efforts to develop appropriate guidance.

The MRP presented the status of the boric acid corrosion program. Current assessments identify possible mechanisms but are not definitive for any one mechanism. After discussing the key comments from an independent panel on the MRP assessment, the MRP identified areas where data was lacking to aid in determining the BAC mechanism. The MRP has sent out requests for proposals for tests to be performed on configurations to provide additional data. The details of the configurations and the tests are in the viewgraphs titled, "EPRI MRP Boric Acid Corrosion (BAC) Program," Accession # ML031740165. The MRP expects three of the tests to take 12 to 18 months to complete and a full-scale mockup to take 30 months. The tests are configured to provide the lacking data. The MRP will report any significant information from the test configurations to the NRC.

The MRP presented the status of the reactor vessel head penetration inspection activities. The MRP first discussed the background of the issue and then described the process used for inspection demonstrations performed to support inspections in the fall of 2001 and the enhancements made for inspections performed in the fall of 2002. The MRP then reported the results of demonstrations performed by various vendors. The MRP said the vendor demonstrations had a variety of techniques but all provided significant inspection information. More information on the demonstration techniques is available in the viewgraphs titled, "Status of RPV Head Penetration Inspection Activities," Accession #ML031740140. The MRP is continuing to refine the nondestructive examination techniques for inspecting various weld surfaces and crack configurations to improve efficiency. Allen Hiser, of the NRC, said that the NRC had received many requests for relaxation of the Order for vessel head inspections. He asked if the MRP would assess whether the requests had a generic technical basis and if so provide that basis to the NRC. This action would assist the staff to determine whether to recommend that a revision of the inspection order should be issued. The MRP agreed to look at the issue.

The MRP presented its process for revising the MRP inspection plan for upper head penetrations (MRP-75). This revision process has resulted in some key changes to the process in MRP-75. The MRP outlined the overall process and then presented the details of its failure modes and effects analysis process. The main evaluations were of a nozzle ejection and of head wastage. The supporting evaluations were for crack growth rates and stress intensity factors. The staff and the MRP discussed the MRP's proposed safety assessment process. The MRP will be prepared to discuss a draft safety assessment in the Fall of 2003 and expects to submit a final safety assessment in the Spring of 2004.

Dr. Peter Riccardella, of Structural Integrity Associates, presented a PFM analysis of control rod drive mechanism (CRDM) nozzles. The presentation objectives were to discuss new analyses performed to address NRC comments on prior analyses, establish agreement on major assumptions in PFM analysis, and demonstrate the use of deterministic and probabilistic fracture mechanics analyses to establish re-inspection intervals for non-visual examinations. Dr. Riccardella gave a technical presentation showing the various stress intensity factors and models for time to first leakage or cracking. He also presented the results of sensitivity studies that had been performed, in part, in response to, previous staff comments. After presenting the information and the MRP conclusions, he answered questions from the staff. The remaining tasks are to complete the analyses for Combustion Engineering and Westinghouse plant types and to complete the documentation.

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In summary, the MRP described its accomplishments towards completing the assessments and approaches for these material issues and the work to be done before issuing final reports. Having completed discussion of the agenda topics, the group adjourned.

Project No. 689

Attachments: As stated

cc: w/atts: See list

In summary, the MRP described its accomplishments towards completing the assessments and approaches for these material issues and the work to be done before issuing final reports. Having completed discussion of the agenda topics, the group adjourned.

Project No. 689
 Attachments: As stated
 cc: w/atts: See list

Material presented at the meeting:

<u>Title</u>	<u>ADAMS Accession No.</u>
Meeting Agenda	ML031740009
Leakage from Bottom Mounted Nozzles at STP	ML031740114
MRP Alloy 600 Butt Weld Assessment	ML031740131
Status of RPV Head Penetration Inspection Activities (Demonstrations)	ML031740140
EPRI MRP Boric Acid Corrosion (BAC) Program	ML031740165
Process for Revising Upper Head Penetration Inspections	ML031740395
Probabilistic Fracture Mechanics Analysis of CRDM Nozzles	ML031740370
Additional Sensitivity Studies for PFM Analysis	ML031740378
Alloy 600 Management for Other Locations	ML031740411
FMEA Analysis Flow Chart	ML031740002

ADAMS Accession # ML032050028
Package # ML031740003

*See previous concurrence

DOCUMENT: G:\RPRP\JBirmingham\Msum-new\MRP MSUM PFM 6-12-03.WPD

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**List of Attendees for June 12, 2003 Meeting with
Material Reliability Program on Materials Issues**

NAME	ORGANIZATION
Alex Marion	NEI
Jim Riley	NEI
Christine King	EPRI
Larry Matthews	Southern Nuclear
Peter Riccardella	Structural Integrity Associates
Charles Brinkman	Westinghouse
Michael Schoppman	Framatome ANP
Paul Gunter	NIRS
Michael Lashley	STP
K.S. Ahluwalia	EPRI
Francois Cattant	EPRI
Craig Harrington	TXU
Glenn White	Dominion Engineering
Randal Schmidt	PSEG Nuclear
Michael Ambrosino	PSEG Nuclear
Michael R. Robinson	Duke
Bob Hermann	SI
Bob Hardies	CEG
William Bateman	NRC/NRR/EMCB
Terence Chan	NRC/NRR/EMCB
Keith Wichman	NRC/NRR/EMCB
Edward Andruszkiewicz	NRC/NRR/EMCB
Edmund Sullivan	NRC/NRR/EMCB
Neil Ray	NRC/NRR/EMCB
Stephanie Coffin	NRC/NRR/EMCB
Joseph Birmingham	NRC/NRR/RPRP
Steve Long	NRC/NRR/SPSB
Allen Hiser	NRC/NRR/EMCB
Bill Cullen	RES\DET\MEB
Karen Gott	RES\DET\MEB (SKI)
Joe Muscara	RES\DET\MEB
Gary DeMoss	RES\DRAA\OERAB
Scott Burnell	OPA
Dan Horner	McGraw Hill
Elaine Hiruo	Platts
*Deann Raleigh	LIS SCIENTECH

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cc: Via email (Use MS Word if available)

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