

June 21, 2001

MEMORANDUM TO: William H. Bateman, Chief
Materials and Chemical Engineering Branch
Division of Engineering

FROM: C. E. Carpenter, Jr., Lead Project Manager */ra/*
Materials and Chemical Engineering Branch
Division of Engineering

SUBJECT: SUMMARY OF JUNE 7, 2001, MEETING WITH THE EPRI MATERIALS
RELIABILITY PROGRAM ON GENERIC ACTIVITIES RELATED TO
CRDM CRACKING

On June 7, 2001, members of the NRC staff and representatives from the EPRI Materials Reliability Program (MRP), the Nuclear Energy Institute (NEI), various licensees, and members of the public participated in a public meeting held at the Nuclear Regulatory Commission (NRC) offices in Rockville, Maryland. Based on the staff's review of the MRP-44, Part 2 report, the staff requested the meeting with the above parties in order to discuss the staff's questions on the subject report and to discuss potential NRC generic communications on this issue. The staff provided a list of supplemental questions to the MRP and NEI prior to the meeting by electronic mail, in order to facilitate and focus the discussion at this meeting. These questions were made publically available prior to the meeting in ADAMS and were posted on the NRC web site for this issue ("Generic Activities on PWR Alloy-600 Weld Cracking," at <http://www.nrc.gov/NRC/REACTOR/ALLOY-600/index.html>). Attachment 1 is the meeting agenda and Attachment 2 lists attendees at the meeting.

By letter dated May 18, 2001, the Nuclear Energy Institute (NEI), as the regulatory interface for the EPRI Materials Reliability Project (MRP), submitted the proprietary (TP-1001491, Part 2) and non-proprietary (TP-1001491-NP, Part 2) versions of the EPRI report, "PWR Materials Reliability Program Interim Alloy 600 Safety Assessments for US PWR Plants (MRP-44), Part 2: Reactor Vessel Top Head Penetrations," for staff information as part of industry's efforts to address any generic implications of the pressurized water reactor (PWR) control rod drive mechanism (CRDM) nozzle reactor pressure vessel (RPV) upper head penetrations (VHPs) and weldments cracking that occurred at Oconee and ANO-1.

Mr. Jake Zimmerman, the Lead Project Manager for this issue, brought the meeting to order and described the purpose of the meeting, the proposed agenda, asked for introductions of the participants at the main table.

Dr. Brian Sheron, the Associate Director for Project Licensing and Technical Analysis (ADT) in the NRC's Office of Nuclear Reactor Regulation (NRR), briefly discussed the history of the CRDM issue, and then indicated the staff's position, at present, in the regulatory process. In

CONTACT: C.E. Carpenter, EMCB/DE
415-2169

addition, he informed the stakeholders present that the staff is considering the need for some form of generic communications to the industry and that it may take the form of either a generic letter or a bulletin, with the main driver being the timeliness of the actions.

Mr. Jack Bailey, Chairman of the MRP, in his opening remarks, stated that the industry recognizes the significance of this issue and is proposing visual inspections of the RPV head penetrations for some number of plants in Fall 2001 refueling outages. Further, the industry is investigating long-term solutions that could obviate the need for frequent inspections (e.g., repair techniques, better non-destructive examinations (NDE) that could reduce the inspection frequencies, etc.).

Mr. Larry Mathews, Chairman of MRP's Alloy 600 Issue Task Group (ITG), then gave an overview of the MRP's presentation and the background of the subject issue. Mr. Mathews provided the MRP's responses to several of the questions the staff had previously provided to the MRP in the areas of leakage detection, the time-temperature histogram used to rank the domestic PWRs, circumferential crack growth, loose parts, and risk assessment, as detailed in the MRP's handout. The MRP's handout is included as Attachment 3, and was posted to the NRC's Alloy 600 web site following the meeting.

The staff asked several questions regarding the information presented on the MRP's handout, including what was the diametrical fit of the two nozzles with circumferential leaks at Oconee Unit 3; these were identified as nozzles H (CRDM #50) and I (CRDM #56) on page 9 of the handout. Additional questions were:

- " describe the inspections conducted at domestic PWRs since 1994, including the types of inspections, scope, and findings of, to include the total number of CRDMs inspected, the number with leakage or other findings, and how this correlates to the time-temperature rankings utilized in the MRP-44 Part 2 report;
- " identify the specific plants by name described on the time-temperature histograms on pages 27 and 28 of the handout;
- " describe the effect on crack growth rate (CGR) arising from potential contaminants and the environment and its effects in the annular space between the CRDM housings and the RPV head;
- " discuss how the applied stress intensities change as the crack grows along the circumference of the CRDM nozzle;
- " provide photos or videos from plants that have conducted visual examinations during recent outages that can illustrate the leakage found and the condition of the RPV head;
- " provide the finite element results of the head and CRDM nozzle interactions;
- " discuss compensatory measures that have been taken by licensees or have been considered by the MRP; and,
- " the impact of the circumferential cracking found at the Oconee units on the commitments previously made in response to Generic Letter (GL) 97-01.

The following action items were agreed to during the meeting:

- " the staff will formally provide the questions previously sent to the MRP by electronic mail (e-mail), and the additional questions listed above, by letter to NEI as the regulatory interface;
- " the MRP will address the staff's questions and will provide a formal response by June 29, 2001; and,
- " further meetings will be scheduled as necessary to facilitate the timely exchange of technical information and to ensure that the stakeholders are kept informed of the status of the issue in the regulatory process

Attachments: As stated



**U.S. Nuclear Regulatory Commission Meeting
with Nuclear Energy Institute and Material Reliability Program**

*Thursday, June 7, 2001
9:00 a.m. - 12:00 noon
Commissioner's Hearing Room*

Purpose: To discuss the Material Reliability Program's (MRP) interim report and response to NRC questions on control rod drive mechanism cracking, and potential NRC generic communications on this issue.

Success: Obtain information from NEI/MRP to determine the need for proceeding with a generic communication and the type and content of such. Inform NEI/MRP and other external stakeholders where the staff is in the regulatory process.

Introduction:	Jake Zimmerman, NRC	9:00 - 9:10 a.m.
Opening Remarks:	Brian Sheron, NRC	9:10 - 9:25 a.m.
Discussion of MRP Interim Report and Response to NRC Questions:	Larry Mathews, MRP	9:25 - 10:15 a.m.
- Break -		10:15 - 10:25 a.m.
Cont. Discussion of MRP Interim Report and Response to NRC Questions:	Larry Mathews, MRP	10:25 - 11:45 a.m.
Closing Comments:	NRC/MRP/NEI	11:45 a.m. - 12:00 noon

Additional information on Generic Activities on PWR Alloy-600 Weld Cracking may be found on the NRC web site at <http://www.nrc.gov/NRC/REACTOR/ALLOY-600/index.html>.

The NRC staff will be available immediately following the meeting to speak with members of the public.



**NRC Meeting with Nuclear Energy Institute and Material Reliability Program on
Control Rod Drive Mechanism Cracking Issue**

**Thursday, June 7, 2001
9:00 a.m. - 12:00 p.m.
Commissioner's Hearing Room**

Name	Organization/Title	Phone Number/Email
Jake Zimmerman	NRC/NRR/DLPM - Lead Project Manager	(301) 415-2426, jiz@nrc.gov
Brian Sheron	NRC/NRR/ADPT - Associate Director	(301) 415-1274, bws@nrc.gov
Jack Strosnider	NRC/NRR/DE - Division Director	(301) 415-3298, jrs2@nrc.gov
Keith Wichman	NRC/NRR/DE/EMCB - Section Chief	(301) 415-2757, krw@nrc.gov
Allen Hiser	NRC/NRR/DE/EMCB	(301) 415-1034, alh1@nrc.gov
Mark Reinhart	NRC/NRR/DSSA/SPSB - Acting Branch Chief	(301) 415-1185, fmr@nrc.gov
Gene Carpenter	NRC/NRR/DE/EMCB	(301) 415-2169, cec@nrc.gov
Roger Hoston	Licensing Support Services / Principal	703-671-9738, Roger@licensing-support.com
Larry Mathews	Southern Nuclear, Mgr. ITS	(202) 992-7729, lkmathews@scatl.com
Altheia Wyche	SERCH Licensing / Bechtel	(301) 228-6401, awyche@bechtel.com
Dennis Weakland	FENOC	224-682-5958 dweakland@firstenergycorp.com
Chuck Rice	SCE & Y	(803) 345-4491 scera.com CRILEO
D. LABOTT	PSEG	856-339-1094
Eric Schoonover	SCE	949-368-2234 schoonej@sings.sce.com
Martin Murphy	CCNPPi	410 495 2544 martin.c.murphy@ccnppi.com
Jim Bennetch	Dominion Generation	(804)-273-3169/Jim.Bennett@dom.com
DAVID LOUNSBURY	PSEG NUCLEAR	856-339-3906
Lee Abramson	NRC/RES/PRAB	(301) 415-6180, LA@NRC.GOV
GEORGE ROMBOLD	AmerGen	610-765-5516 george.rombold@exeloncorp.com
Robert Hermerman	SIA	570-710-6717 R.Hermerman@edelfphia.com
Steve Fyfe	FRA-ANP	412-264-1610/sfyfite@frantec.com
Karl Haslinger	Westinghouse	860-285-2606/Karl.H.Haslinger@U.S.Westinghouse.com



NRC Meeting with Nuclear Energy Institute and Material Reliability Program on Control Rod Drive Mechanism Cracking Issue

Thursday, June 7, 2001
 9:00 a.m. - 12:00 p.m.
 Commissioner's Hearing Room

Name	Organization/Title	Phone Number/Email
Maggie W. Weston	ACRS	415-3151 mww@nrc.gov
JIM CHUNG	NRC	
L.N. OLSHAN	NRC	415-1419
RALPH LANDRY	NRC	415-1140
Ramin Assa	NRC	415-8206
Michelle Snell	NRC	415 1840
Dwight Snowberger	NRC	415-2007
Bobinski	NRC	415-8200
Jim Clapper	NRC	415-1430
Les Cupidan	NRC	415-6366
Matthew L. Mitchell	NRC	415-3303
Jac Collins	NRC	415-1058
Bill Bateman	NRC	
FAROUKELTAWILA	NRC	415-5741
MOTOHISA FUJITA	KANSAI ELECTRIC POWER	202-654-1138
JAMES MEDOFF	NRC	301-415-2715, jxm@nrc.gov
Bill Campbell	Entergy Operations, Inc.	601-368-5307 wcampb3@entergy.com
Bill Gray	Framebone ANP	804-832-2783
AMARION	NEI	202 739 8080
Ross Telson	NRC	415-1175
Glenn White	Dominion Engineering, Inc.	703-790-5544; gwhite@domeng.com
Steve Hunt	Dominion Engineering, Inc.	703-790-5544; shunt@domeng.com

