March 13, 2007

MEMORANDUM TO: Stacey L. Rosenberg, Chief
Special Projects Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

FROM: Tanya M. Mensah, Senior Project Manager **/RA/**
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Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF THE DECEMBER 20 2006, CATEGORY 2 PUBLIC MEETING RE: MEETING WITH THE NUCLEAR ENERGY INSTITUTE (NEI) TO DISCUSS IMPLICATIONS OF WOLF CREEK DISSIMILAR METAL WELD INSPECTIONS (TAC NO. MD0694)

On December 20, 2006, a Category 2 public meeting was held between the U. S. Nuclear Regulatory Commission (NRC) staff and industry representatives at NRC headquarters. A list of attendees is enclosed. The purpose of this meeting was for the NRC staff to present its analysis of the Wolf Creek inspection results and provide a summary of its safety concerns. The meeting also provided industry representatives with the opportunity to present its evaluation of the Wolf Creek inspection results. The December 20, 2006, meeting was the third public meeting held on this topic. The first public meeting to discuss this topic was held on November 16, 2006 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML063320131). The second public meeting to discuss this topic was held on November 30, 2006 (ADAMS Accession No. ML063560371).

The NRC staff opened the meeting by providing a summary of primary water stress corrosion cracking (PWSCC) experience in Alloy 82/182 Butt Welds, industry actions, and the NRC regulatory approach prior to the MRP-139 examinations. The NRC staff discussed the Wolf Creek pressurizer nozzle weld inspection results and emphasized the need to utilize the existing information to develop a shared understanding of the Wolf Creek indications and the impacts upon the inspection schedules contained in MRP-139, “Materials Reliability Program: Primary System Piping Butt Weld Inspection and Evaluation Guidelines” (ADAMS Accession No. ML052150196).

In its presentation, the NRC staff provided a summary of its safety concerns regarding potential pressurizer weld cracking (ADAMS Accession No. ML063530327). A primary concern that the NRC staff conveyed was that the current inspection schedule may not be appropriate for pressurizer nozzle welds that have not yet been inspected. The NRC staff expressed concerns regarding the discovery of the first large/multiple circumferential flaws at Wolf Creek. Based upon the operating experience prior to Wolf Creek, the NRC staff and industry representatives would have only expected to find small axial indications, not large/multiple circumferential flaws which could lead to a potential rupture.

The NRC staff provided a summary of its fracture mechanics analyses of the Wolf Creek inspection results. The NRC staff performed calculations to estimate the amount of time that it took for cracks to initiate, based upon the Wolf Creek inspection data. For the surge, relief, and safety nozzle welds, the NRC staff estimated the following:

- When the crack may have initiated,
- The amount of time for the flaws to result in leakage, if the flaws had been left in service, and
- The amount of time for the flaws to reach a critical flaw size and rupture, if the flaws had been left in service.

A more detailed summary of the NRC staff's analysis is provided in the NRC presentation slides. The NRC staff concluded its presentation by stating that in general, long circumferential flaws decrease the amount of time to leak and the time between leakage and rupture, and circumferential flaws in smaller diameter welds are less likely to leak prior to rupture.

Presentations given by the industry representatives provided an overview of the following:

- The Pressurizer Alloy 600 Weld Inspection Program.
- The effect of Wolf Creek inspection findings on pressurizer inspection/mitigation plans.
- Flaw tolerance and crack growth.
- Probability of critical flaws in uninspected pressurizer welds.
- Leakage monitoring.
- Consequences of Accelerated Mitigation Schedules.

In addition, industry representatives presented the results of fracture mechanics analyses of the relief nozzle weld that account for residual stress relaxation. These analyses showed more time to failure than the NRC analyses, but indicated that there is still little or no time between leakage and rupture. Industry representatives presented the results of probabilistic analyses of flaws in uninspected nozzle welds. While these analyses indicate very low probability of a loss of coolant accident, NRC staff discussed the reasons for its conclusion that the available data and current lack of understanding of the underlying physics of the degradation mechanism make any estimates of risk too unreliable to support a regulatory decision on this issue.

Industry representatives concluded that the industry inspection program and schedule continue to provide a valid approach for inspection and mitigation of pressurizer welds. The NRC staff concluded that the results of the analyses of the Wolf Creek inspection cause concerns regarding the adequacy of the current inspection program and that the NRC staff would be making a decision in the near future regarding the need for more aggressive inspections.

A more detailed summary of the industry analysis is provided in its presentation slides (ADAMS Accession No. ML063620025).

The NRC staff closed the meeting by conveying its next step to use the available information to make a regulatory decision on whether inspections or overlays need to be completed in a more expedited time frame.

Members of the public were in attendance. No public meeting feedback forms were received.

Project Nos. 669 and 689

Enclosure: List of Attendees

cc w/encl: See next page

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ADAMS Package Accession Number: ML070360494
Meeting Notice Accession Number: ML063390242
Meeting Handout Accession Numbers: ML063620025, ML063530327
Meeting Summary Accession Number: ML070330381 NRC-001

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NAME	TMensah	DBaxley	TChan	SRosenberg
DATE	2/ 27 /07	2/ 27 /07	3/ 13 /07	3 / 13 /07

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List of Attendees for December 20, 2006	
Name	**Organization**
Tom Alley	Duke Energy
Masato Ando	Japan Atomic Power Co.
John Arhar*	Diablo Canyon/PG&E
Warren Bamford	Westinghouse
Scott Boggs*	FPL
John Broussand	Dominion Engineering
Terence Chan	NRC
Nancy Chapman*	Bechtel
David Chrzanowski*	Exelon Nuclear - Cantera
Joseph Congdon	Westinghouse
Dana Couch*	TVA
Dana Covill	Progress Energy
Bradley Cox	BWX Technologies
John Crane*	Westinghouse
Trish Conrad*	Nuclear Energy Institute
Aladar Csontos	NRC
Joe Donahue	Progress Energy
Mason Dove	Southern Nuclear Co.
Bob Endter	Westinghouse
Bret Flesner	Areva NP
Terry Garrett	Wolf Creek Nuclear Operating Corp (WCNOC)
Jeff Gasser	Southern Nuclear
Rudy Gill	FPL
David Gonzalez*	Diablo Canyon
Kim Gruss	NRC
Mark Hall	Dominion
Bob Hardies	NRC
Craig Harrington	Electric Power Research Institute (EPRI)
Daniel Horner	McGraw-Hill
Kevin Hour	BWX Technologies

ENCLOSURE

Kaihwa Hsu	NRC
Steve Hunt	ESH, LLC
Brandon Jenewein*	South Texas Project
Tom Jordan	South Texas Project Nuclear Operating Company (STPNOC)
Greg Kammerdeiner	FENOC
Ken Karwoski	NRC
Christine King	EPRI
Carl Lane*	Cook Nuclear Plant
Steven Laur	NRC
Steve Long	NRC
Tim Lupold	NRC
Fred Madden	TXU
Alex Marion	NEI
Richard A. Mattson, P.E. *	Structural Integrity Associates, Inc.
Terry McAlister	SCE & G
Jerry McClannahan*	TVA
Tanya M. Mensah	NRC
Quynh Nguyen	NRC
William J. Pierce, Jr., P.E.*	Tennessee Valley Authority
Jeff Pophler	Constellation
Thomas Raidy	SCE - SONGS
Deann Raleigh*	Scientech, LLC
Pete Riccaroella	Structural Integrity
Jim Riley	Nuclear Energy Institute (NEI)
Mike Robinson	Duke
Dave Rudland	EMC^2
Dan Schlader	Areva NP
Amir Shahkarami	Exelon
Simon Sheng	NRC
William Sims	Entergy
Duane N Snyder*	GE Infra, Energy
David A. Steininger	EPRI

Dan Stepanovic*	AmerenUE/Callaway NPP
Edmund Sullivan	NRC
Dom Sutton	Southern Nuclear Co.
Jam Thayer	NEI
Victor G. Thomas, P.E.*	San Onofre Nuclear Generating Station
Philip Walker*	South Texas Project
Robert Waselus	SCE & G
Dave Waskey	AREVA
Dennis Weakland	First Energy
Glenn White	Dominion Engineering, Inc.
Mike Winsor	Arizona Public Service
Keith Wooten	Southern Nuclear
Ken Yoon	AREVA NP

* Participated via Teleconference

Nuclear Energy Institute
Electric Power Research Institute

Project No. 689
Project No. 669

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