November 15, 2006

FACILITY: ELECTRIC POWER RESEARCH INSTITUTE
CHARLOTTE, NORTH CAROLINA

SUBJECT: SUMMARY OF OCTOBER 24, 2006 MEETING WITH ELECTRIC POWER RESEARCH INSTITUTE ON MATERIALS ENGINEERING RESEARCH PROGRAMS

On October 24, 2006, Nuclear Regulatory Commission (NRC) staff met with representatives of the Electric Power Research Institute (EPRI) Materials Reliability Program (MRP) in a public meeting at the EPRI offices in Charlotte, North Carolina. A list of meeting attendees is provided as an enclosure of this memorandum. At this meeting, NRC and MRP representatives presented a review of the research programs that address non-destructive examination (NDE) and stress analysis (SA) for components fabricated from nickel-base alloys and their associated welds. These nickel-base alloys are used typically as vessel penetrations and piping component butt welds. The purpose of the meeting was to evaluate the coordination of these research programs, to ascertain, for example, whether the NRC is performing confirmatory research in the most efficacious way, and to identify any unnecessary overlap between the programs.

W. Cullen, from the Office of Nuclear Regulatory Research (RES), reviewed the elements of the User Need Requests (UNRs) encompassing SA and NDE for these materials. The NRC presentation outlined the stress and fracture mechanics analyses that will be completed over the next several months, and how these results will be compared or contrasted with MRP computations for the same or similar components. Al Ahluwalia, of EPRI-Palo Alto and the program manager for the Mitigation and Testing Issue Task Group of the MRP presented an overview of the MRP programs associated with nickel-base alloys. The MRP presentation described how an industry focus group identified and prioritized gaps in the existing research knowledge in the area of nickel-base alloy research. The MRP is distributing research funding according to this prioritized list of tasks.

A. Csontos, from RES, described upcoming research addressing component inspection, evaluating mitigation methodologies, and management of primary water stress corrosion cracking (PWSCC). Part of this program involves a careful review of probabilistic fracture models, in order to improve a computer code (PRO-LOCA) for predicting the leakage and fracture probabilities in thin-walled components (basically piping). Stress analysis and flaw evaluation for vessel penetrations and piping butt welds are included in this area.

J. Broussard, from Dominion Engineering, Inc. presented a summary of industry activities on stress analysis and fracture mechanics evaluation of nickel-base materials, covering welding residual stress analysis and other, related topics. This presentation reviewed the ongoing industry activities on stress analysis, and offered some details on how residual stress calculation are incorporated in safety assessments and guide inspection activities. Part of the research on analysis of stresses in welded configurations addresses the presence of fabrication flaws (such as hot cracks or lack of fusion) on the structural integrity and susceptibility to cracking of these structures. Several completed research programs have concluded that PWSCC and hot cracks do not interact with each other.

S. Doctor, of PNNL, presented four, short synopses of NRC programs addressing various aspects of NDE programs for inspection of welded joints: (a) examination of control rod drive mechanism (CRDM) housings salvaged from the North Anna Unit 2 discarded reactor vessel head, (b) a description of the Program for Inspection of Nickel-alloy Components (PINC), (c) NDE studies considering leak-before-break and PWSCC mitigation (by stress reduction), and (d) other NDE issues, including an assessment of NDE reliability and effectiveness, improvements in NDE techniques, and improvements in codes and standards.

J. Spanner, of EPRI-Charlotte, presented an overview of NDE program focus areas for this year and the next two years. This presentation pointed out the necessity of developing guidance for welding overlays and their subsequent inspection, continuing to develop and demonstrate methods for CRDM inspection, and plans to apply phased array ultrasonic techniques to vessels, piping and dissimilar metal welds.

Both the MRP and NRC presentations were punctuated by questions and comments from the attendees. During the meeting wrapup, an action list was developed, comprised of requests for data, materials and other information to be exchanged between the MRP and RES.

The meeting was adjourned at 4:35 pm.

Sincerely,

/RA/

William H. Cullen, Sr. Materials Engineer
Corrosion and Metallurgy Branch
Division of Fuels, Engineering and Radiological Research
Office of Nuclear Regulatory Research

Enclosures: 1. List of Attendees

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Division of Fuels, Engineering and Radiological Research
Office of Nuclear Regulatory Research

Enclosure: List of Attendees

DISTRIBUTION:	DFERR r/f,	ME r/f	B. Sheron	J. Wiggins	W. Norris
	D. Jackson	J. Uhle	R. Assa	A. Valentin	R. Hardies
	B. Bateman	J. Collins	A. Contos	K. Gruss	E. Sullivan
	T. Chan	A. Chapeton	M. Mayfield		

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NAME	W. Cullen		A. Valentin		SUNSI Review		Div. Secretary		J. Uhle	
DATE	11 /15 /06		11 /15/ 06		11 /14 /06		11 /15 /06		11 /15/06	

OFFICIAL RECORD ONLY

List of Attendees

NRC - EPRI/MRP Meeting on Coordination of Ni-Base Alloy Research Programs

Bill Cullen	USNRC
Christine King	EPRI
Jack Spanner	EPRI
Bud Auvil	Structural Integrity Associates
Gery Wilkowski	Engineering Mechanics Corporation of Columbus
Paul Scott	Battelle-Columbus
George Schuster	PNNL
Wallace Norris	USNRC
Aladar Csontos	USNRC
Jay Collins	USNRC
John Broussard	Dominion Engineering, Inc.
Glenn White	Dominion Engineering, Inc.
Deborah Jackson	USNRC
Carol Moyer	USNRC
Al Ahluwalia	EPRI
Steve Doctor	PNNL