February 10, 2011

MEMORANDUM TO: Robert L. Dennig, Chief
Containment and Ventilation Branch
Division of Safety Systems
Office of Nuclear Reactor Regulation

FROM: Joseph A. Golla, Project Manager ***/RA/***
Licensing Processes Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF JANUARY 19, 2011, PUBLIC MEETING WITH THE BOILING WATER REACTOR OWNER'S GROUP (BWROG)

On January 19, 2011, U.S. Nuclear Regulatory Commission (NRC) staff met with representatives of the BWROG, in a public meeting at NRC headquarters in Rockville, Maryland. The purpose of the meeting was to discuss the status of containment accident pressure (CAP) activities regarding the crediting of CAP in emergency core cooling pump net positive suction head (NPSH) calculations.

The Enclosure provides a list of those in attendance. Information presented at the meeting is available in the NRC Agencywide Documents Access and Management System (ADAMS) at Accession No. ML110210163.

Opening remarks were made by Mr. William Ruland, Director, Division of Safety Systems (DSS), Office of Nuclear Reactor Regulation (NRR), and Mr. Ted Schiffley, Chairman, BWROG. Mr. Schiffley indicated it would be helpful for the BWROG to communicate with the NRC staff concerning what is needed to respond to the Advisory Committee on Reactor Safeguards (ACRS) letter dated May 19, 2010 (ADAMS Accession No. ML101300332) to the NRC. He indicated it would be advantageous for him to go to the BWROG executive committee once to procure funding for the effort rather than multiple times.

Mr. Richard Lobel, Senior Reactor Systems Engineer, Containment and Ventilation Branch (SCVB), DSS/NRR, also made remarks concerning the current status of NRC CAP activities. Mr. Lobel stated that the DRAFT guidance document (responding to the ACRS letter) on the use of CAP in determining NPSH margin and Commission paper (due to the NRC Commission in January 2011) have received the review of the NRC staff, including the NRC Offices of New Reactors and General Council, and the NRC staff is working to finalize these documents.

Mr. Ted Schiffley inquired if the BWROG would participate in the development and finalization of the Commission paper and offered the assistance of the BWROG. Mr. Lobel and Mr. Ruland both stated that would not be needed because the Commission paper is being written at a high "policy level" and will not address the specific topics of this meeting. Mr. Schiffley inquired as to the schedule for the upcoming activities. Mr. Ruland stated that the Commission paper would be going to the NRC Commission by the end of January and that the NRC staff would be meeting with the ACRS on February 11, 2011, to discuss the paper. Mr. Robert Dennig, SCVB Branch Chief, and Mr. Lobel requested that the BWROG be represented at the ACRS meeting

but that a BWROG presentation was not needed. Mr. Dennig further indicated that the most important item for now is to “fill in the blanks” on the guidance document and that he was hopeful the BWROG could help do that at the current public meeting.

At this point in the meeting, Mr. Alan Wojchouski, BWROG CAP Committee Chairman, made a presentation. Slides for the presentation titled, “BWROG Actions to Address Containment Accident Pressure Issues,” may be viewed at ADAMS Accession No. ML110210163.

The purpose for the BWROG’s presentation was to define a path forward for obtaining the final safety evaluation from the NRC staff for the BWROG CAP Licensing Topical Report (LTR) NEDO-33347P, Rev. 0, “Containment Overpressure Credit for Net Positive Suction Head (NPSH)” (ADAMS Accession No. ML080520262) and to define a path forward to re-engage BWR extended power uprate CAP reviews. A brief background description of these activities appears in the presentation slides.

A significant portion of the BWROG’s presentation addressed technical issues introduced in the DRAFT guidance document. In the DRAFT guidance document, the following CAP-related issues are introduced: uncertainty terms for NPSHr, limits of the maximum erosion zone and whether it is significant in the context of BWR accident analysis, testing requirements for the situation in which NPSHa < NPSHr, and definition of events for which NPSHr uncertainties are applied. In support of development of the guidance document, the NRC staff requested industry and vendor input on the DRAFT guidance document including the uncertainty values for the following effects on required NPSH: pump field speed variation, suction piping configuration, dissolved gas, water temperature, instrument uncertainties, pump wear ring wear, and effect of gas accumulation on pump seals. The BWROG’s presentation and discussion at this meeting addressed the NRC staff’s information request.

Notable in the BWROG’s response to the NRC staff’s information request is its proposal to use computational fluid dynamics (CFD) to address NPSHr uncertainty. CFD appears to have matured in recent years to a fairly accurate predictor of pump performance. It was therefore decided that the NRC staff and the BWROG will continue to discuss its application to uncertainties in required NPSH. This application necessitates not only modeling of rapid rotating fluid motion but also accurate modeling of the thermodynamics of air, water, and water vapor.

Slide 21 of the BWROG presentation addresses NRC Guideline 4.9 from the DRAFT guidance document concerning zone of maximum pump erosion rate. Cavitation may produce the maximum erosion before any indication of changes in flow rate or pump discharge head occur. The NRC staff has proposed a time limit of 100 hrs. for operation in this maximum erosion zone. However, the NRC staff is hopeful that the BWROG can provide more detailed analysis of this condition which could result in a different allowable time for operating in this zone or a demonstration that consideration of this effect is not important in the time frame of the postulated accidents considered. The use of CFD is a possibility for this work also. It would be coupled with an empirical algorithm to predict the erosion wear.

To address the NRC guidelines in the DRAFT guidance document pending completion of CFD analysis, the BWROG has proposed a value of 5 ft for the interim total uncertainty in required NPSH. The NRC staff has not yet reached a decision about the use of an interim uncertainty to be used until the uncertainty determined by CFD calculations is established.

Mr. Lobel stated that the available NPSH should be calculated using the statistical analysis (Monte Carlo) method proposed by the BWROG in its topical report NEDO-33347P (ADAMS Accession No. ML080520262). This provides a quantitative estimate of the available NPSH.

The DRAFT guidance document states that licensees should ensure that CAP cannot be lost when needed to ensure NPSH margin either by (1) spurious opening of containment isolation valves caused by a postulated Appendix R fire or by (2) following emergency operating procedure instructions to vent the containment in an abnormal or emergency event.

The BWROG will provide a comprehensive plan and schedule for performing the evaluations described in the presentation. The NRC representatives agreed to provide written feedback to the BWROG on the plan and schedule.

There were no questions from members of the public and the meeting was adjourned.

Enclosure: List of Attendees

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RidsOgcMailCenter
RidsNrrLABaxley

Joe Golla
John Jolicoeur
Melissa Ash
Robert Dennig
Richard Lobel
William Ruland
George Stramback (strambgb@westinghouse.com)
Fred Emerson (frederick.emerson@ge.com)

ADAMS ACCESSION NUMBERS:
Package: ML110200490 Notice: ML110050142 Agenda: ML110050151
Summary: ML110340390 Presentation: ML110210163

OFFICE	PM:DPR:PLPB	LA:DPR:PLPB	BC:DSS:SCVB	PM:DPR:PLPB
NAME	JGolla	DBaxley	RDennig	JGolla
DATE	2/10/11	2/9/2011	2/10/2011	2/10/2011

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List of Attendees for January 19, 2011

Meeting between the U.S. Nuclear Regulatory Commission (NRC) and

the Boiling Water Reactors Owners Group (BWROG)

Jen Luke	Westinghouse EC
Bertran Morris	ESJ-TVA
Eric Geyer	Progress Energy
William Bentley	TVA
Kevin Borton	Exelon-Power Uprate
Alan Wojchouski	BWROG
Kenneth Welch	BWROG (GEH)
John Freeman	BWROG (Exelon)
Fred Emerson	BWROG (GEH)
Michael Crowthers	BWROG (Susquehanna)
Craig Nichols	BWROG (GEH)
Ted Schiffley	BWROG (Exelon)
Chris Boyd	NRC/RES
Bob Dennig	NRC/NRR
Clint Ashley	NRC/NRO
William Ruland	NRC/NRR
Chris Gratton	NRC/NRR
Diego Saenz	NRC/NRO
Tom Alexion	NRC/NRR
Bob Wolfgang	NRC/NRR
Joe Golla	NRC/NRR
Steve Philpott	NRC/NRR
Ahsan Sallman	NRC/NRR
Peter Tam*	NRC/NRR
Deann Raleigh*	Scientec
John Fields*	Monticello
Steve Hammer*	Monticello

* Attended via telecon

ENCLOSURE