February 9, 2011

MEMORANDUM TO: Stewart N. Bailey, Chief
Safety Issues Resolution 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 NOVEMBER 17, 2010, PUBLIC MEETING WITH THE BOILING WATER REACTOR (BWR) OWNER'S GROUP (BWROG)

On November 17, 2010, U.S. Nuclear Regulatory Commission (NRC) staff met with representatives of the BWROG, in a public meeting in Rockville, Maryland. The purpose of the meeting was to discuss the review of BWR emergency core cooling system (ECCS) suction strainer issues. Note that a portion of the meeting (In-vessel Downstream Effects) was closed to public participation because information proprietary to GE Hitachi Nuclear Energy Americas, LLC, was presented and discussed. Prior to the meeting, the BWROG submitted to the NRC, a letter and affidavit, in accordance with Title 10 of the Code of Federal Regulations (10 CFR) Section 2.390, attesting to the proprietary nature of the material to be discussed at the meeting, and representative draft material. Enclosure 1 provides a list of those in attendance. Enclosure 2 is the meeting agenda. Non-proprietary information presented at the meeting is available in the NRC Agencywide Documents Access and Management System (ADAMS) under package Accession No. ML110470367.

This was the fourth of four monthly meetings being held August through November 2010, in order for the BWROG to present to the NRC its preliminary assessment of twelve technical issues to address ECCS suction strainer performance. Three issues were addressed at this meeting, three were addressed at a meeting held on October 20, 2010 (summary at ADAMS Accession No. ML103010393), three were addressed at a meeting held September 22, 2010 (summary at ADAMS Accession No. ML102800152), and three were addressed at a meeting held on August 10 and 11, 2010 (summary at ADAMS Accession No. ML102360056). The twelve technical issues were initially presented to the BWROG by the NRC staff at a public meeting held on November 27, 2007 (summary at ADAMS Accession No. ML080240235). The three issues discussed at this meeting were: In-vessel Downstream Effects (closed portion of meeting), Latent Debris, and Debris Transport and Erosion.

Mr. Sher Bahadur, Deputy Division Director of the Division of Safety Systems (DSS), of the Office of Nuclear Reactor Regulation (NRR), made opening remarks. Mr. Bahadur stated that strainer testing has shown to be a challenging approach to solve the problem of establishing adequate strainer performance. Therefore, going forward, the NRC will be looking for repeatable test results in order to provide assurance of the adequacy of strainer performance.

Mr. Ted Schiffley, BWROG Chairman, made opening remarks on behalf of the BWROG. Mr. Schiffley urged the NRC to provide feedback to the BWROG on the last three meetings (August thru October mentioned above). Mr. Stewart Bailey, Chief of the Safety Issues Resolution Branch (SSIB), DSS, NRR, stated that the staff will provide written feedback to the

BWROG addressing all four meetings, August thru November, after this meeting. He indicated that the staff has not seen anything "moving in the wrong direction" over the last three meetings and that the time frames and resolution paths look reasonable.

Review of Action Items

Mr. Steve Scammon, ECCS Suction Strainers Committee Chairman for the BWROG presented a briefing which reviewed the status of Action Items identified in the previous meetings.

Actions 2&3: Open. Air Jet Testing, 40 percent Reduction in Destruction Pressure: The BWROG is to revise their draft position paper (provided to the staff October 17, 2010) to identify operating process parameters and relative amounts of subcooling and how these relate to jet pressures between pressurized water reactors (PWRs) and BWRs. Due December 15, 2010.

The NRC staff stated that, prior to the BWROG's draft paper "Application of 40% Reduction In Debris Damage Pressures to BWRs, Rev. 1 (ADAMS Accession No. ML103000334) a sufficient case has yet to be made to support the assertion by the BWROG that the use of stagnation pressure as the damage pressure accounts for differences among media, i.e., air, steam, steam/water mixture. Mr. Stewart Bailey stated that the staff will review the BWROG's paper on this issue and pursue resolution either with public conference calls or through public meetings. These conference calls or meetings would likely involve both BWR and PWR industry representatives.

Action 5: Closed. Zone of Influence (ZOI) of Protective Coatings: The BWROG was considering two different methods of evaluating qualified coatings load with new coatings ZOI, new plant walkdowns of six selected plants or a document review of recently performed walkdowns. The BWROG was, at this meeting, to provide information on the scope of the six plant walkdowns if it had chosen this path. The BWROG stated they decided to conduct this analysis by review of documented plant walkdowns performed recently. The BWROG stated that the recent walkdowns would be utilized for review only if they meet standards for comprehensiveness. Mr. Matt Yoder, NRR Division of Component Integrity (DCI), and lead staff chemical engineer for this issue, stated that it is important that walkdowns be conducted by qualified personnel in accordance with Regulatory Guide 1.54, Service Level I, II, and III Protective Coatings Applied to Nuclear Power Plants," Rev. 2.

Action 6: Open. Spherical ZOIs based on Reactor Coolant System (RCS) pressure: The BWROG is to provide a calculation comparing spherical ZOIs for BWRs and PWRs based on RCS pressure differences. Due March 31, 2011.

Action 8: Open. Holdup Volumes in the Drywell: Holdup volumes in the drywell result in hotter pool temperatures which may induce a chemical effect. The BWROG is to evaluate this possibility. Due December 31, 2010.

The BWROG addressed this Action preliminarily in a letter to the NRC dated January 5, 2011 (ADAMS Accession No. ML110070025). The BWROG stated in this letter that they will document their more detailed evaluation of active and inactive holdup volumes on chemical effects for the three BWR containment designs (Mark I, II, III) in the BWR Material Dissolution Test Plan to be issued in the fourth quarter of 2011. This Action Item will remain open pending the NRC staff's review of this Test Plan.

Action 11: Closed. Staff Position on Spherical ZOI: NRC staff to provide a clear statement of intent on whether it plans to revise its position on ZOI. The technical concern is that, while a spherical ZOI (accepted by the NRC staff) may have maximized the quantity of debris, it may have precluded the selection of a lesser amount of more problematic debris, such as microporous or calcium silicate insulation.

This Action is closed but the technical issue remains. The NRC staff decided that spherical ZOIs, as applied, contain adequate conservatism such that localized concentrations of debris outside of the spherical ZOI, but potentially within a more realistic directed jet ZOI would usually be adequately accounted for in the spherical ZOI. However, plants should review the potential debris sources within the containment for materials that are known to be particularly problematic. If these materials are present in containment and are not accounted for in the debris generation calculation due to spherical resizing of the ZOI, the plant should evaluate whether destruction of these materials and others within a directed jet would result in a more limiting debris generation scenario than that calculated by the spherical method and adjust their source term accordingly. The resolution strategy outlined by the BWROG on slide 13 of their presentation on this issue (Spherical ZOI, ADAMS Accession No. ML102800091) at the September 22, 2010, public meeting (meeting summary at ML102800152) is found to be acceptable.

Action 12: Open. Near Field Effects: The BWROG representatives stated that the BWROG plans to do a survey of BWR strainer vendors and licensees on how near field effects were addressed, and that it will seek NRC staff feedback before sending it out. The NRC staff stated that the survey should address methods used for searching for boreholes and bed degradation as a basis to support the validity of temperature scaling. The draft survey was to have been provided before the November meeting and discussed then but was not yet developed. The schedule now is for the survey to be available for staff review during the first quarter of 2011.

Action 13: Open. Debris Characteristics: The BWROG to develop an additional guidance document that addresses how utilities will resolve differences between their current analyses on debris characteristics, and that of another guidance document, still to be developed, that will identify acceptable debris characteristics. Due June 2011.

Action 14: Closed. Head Loss Assessment: Slide 14 of October presentation on head loss was unclear about when the NRC staff would see the surveys that will be developed and utilized for developing supplemental guidance on head loss assessment. The BWROG clarified this in Meeting Slide no. 11 of the presentation on Action Items for this meeting which indicates the surveys will be available to the staff in the first quarter of 2011.

Action 15: Closed. Documentation: The BWROG was to clarify what will be incorporated into the Utility Resolution Guide (URG) update and what will reside in separate Topical Reports (TRs) and technical papers. The target date for this was as of this meeting. The BWROG requires more time for this and is currently reviewing it. The new due date for this is December 31, 2010.

The BWROG addressed this Action in a letter to the NRC dated January 5, 2011 (ADAMS Accession No. ML110070027).

Action 16: Open. Staff Feedback on resolution process: The NRC staff will provide written feedback on the BWROG's overall process for resolving the BWR ECCS suction strainer issues. This will be provided to the BWROG after the November meeting.

Action 17: Open. Staff Feedback on Schedule: The NRC staff will provide feedback to the BWROG regarding the detailed schedule available at ADAMS Accession No. ML102520050.

Technical Issues This Meeting

Following the review of Action Items, the BWROG made presentations on the three technical issues on the agenda for this meeting.

Issue No. 2, Downstream Effects on Fuel (DSE-F)

The first presentation, on Issue No. 2, titled "Downstream Effects on Fuel," was given by Mr. Dan Fouts, DSE-F Vice Chairman for the BWROG ECCS Suction Strainers Committee. This portion of the meeting was closed to public participation. A version of the presentation with proprietary information redacted may be viewed at ADAMS Accession No. ML103370673. The presentation covered topic history including a regulatory summary and problem statement, Program Plan including objective, resolution strategy, relationships to other issues, next steps and milestones, and the status of current work including DSE-F Licensing Topical Report (LTR) summary and preview, and test plan outlines.

In-vessel debris blockage has not yet been formally evaluated for BWRs. In order to address this, the BWROG identified three main issues for evaluation; blockage at the core inlet and outlet, collection of debris at spacer grids, and deposition of fiber and chemical precipitates on fuel rods. The BWROG's stated objectives are; to demonstrate that 10 CFR 50.46 criteria for all BWR fuel vendors are acceptably met when the effect of downstream loss-of-coolant accident (LOCA) debris is considered, to resolve this issue such that plant-specific BWR licensing basis LOCA calculations do not need to be revised, and to demonstrate safety by using either generic or plant-specific LOCA analyses, including downstream debris effects, in formal submittals along with validation by a fuel testing regimen.

Mr. Anthony Mendiola, Chief of the Nuclear Performance and Code Review Branch (SNPB), NRR, DSS, asked what acceptance criteria would be used for testing. A BWROG representative stated that the test acceptance criteria will be developed from the analysis and that the testing would then validate the analysis. Each BWR fuel vendor (General Electric, Westinghouse Company, Areva, NP, Inc.) will provide a fuel bundle to test.

Action 18: Mr. Mendiola asked about the representative nature of the testing, that is, the testing of one fuel bundle representing a core. The BWROG took an action to describe this. This action will be done at a near future follow-on meeting.

Mr. Mendiola asked what the BWROG's role is in reconciling differences in evaluation results among the BWR fuel vendors. Mr. Ted Schiffley of the BWROG stated that the BWROG takes full responsibility, i.e., "owns" this project and the BWROG will make sure the test and analysis results of the non-General Electric fuel vendors (Westinghouse and Areva) make sense and will not simply pass on whatever results come about from the analyses and testing.

Issue No. 6, Latent Debris

The second presentation, on Issue No. 6 titled, "Latent Debris," was given by Mr. Tony Borger, Source Term Vice Chairman for the ECCS Suction Strainers Committee. The presentation covered issue overview, problem statement, objective, background, key differences between PWRs and BWRs, resolution strategy, key relationships to other issues, and next steps and milestones. The BWROG's stated objectives for this issue are to; define the dirt/dust term, provide a method to conservatively determine the mass and characteristics of dirt/dust, and to provide guidance on evaluating the impact of dirt/dust on existing analysis.

It was agreed that the BWROG will provide the approved walkdown guidance document for latent debris to the NRC staff for information. An NRC staff member asked if currently failed coatings would be included in the latent debris sample collections. The NRC staff member indicated that licensees should build margin into their estimates to account for uncertainties like ablated concrete.

Issue No. 9, Debris Transport and Erosion

The third presentation, on Issue No. 9 titled, "Debris Transport and Erosion," was also given by Mr. Tony Borger of the BWROG. The presentation covered issue overview, objective, URG assessment, Generic Safety Issue-191 approach, proposed resolution, key relationships to other issues, and next steps and milestones. The BWROG's stated objective is to develop a position paper confirming the validity and conservatism of the URG recommendations for debris transport and the treatment of erosion.

Other

Action 19: BWROG is to propose an implementation plan for how utilities will address (i.e., close) all of the twelve issues. Due December 31, 2011. Mr. Stewart Bailey of the NRC stated that if licensees are not bounded by the TRs then plant-specific analysis will be needed and that the NRC staff will require descriptive information on how they did their evaluations.

Mr. Ted Schiffley of the BWROG stated that the BWROG and the NRC staff needs to be in agreement on the debris source term (e.g., Actions 2&3 regarding the 40 percent reduction in destruction pressure issue), that this is very important because everything hinges on it. Mr. Stewart Bailey of the NRC stated that the staff will make sure to be in agreement with the BWROG on how to develop source term "sooner rather than later."

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

Enclosures:
1. List of Attendees
2. Meeting agenda

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NAME	JGolla JG	DBaxley DB	RTaylor RT	TMendiola TM	SBailey	JGolla
DATE	1/14/2010	1/19/2010	1/19/2010	1/24/2010	2/9/11	2/9/11

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List of Attendees for November 17, 2010,

Meeting with the Boiling Water Reactors Owners Group (BWROG)

Stuart Cain	Alden Research
Michael Kennard	Anatech Corp.
Steve Scammon	BWROG/Energy NW
Rob Choromokos	Alion Science
Pete Mast	Alion Science
Ted Schiffley	BWROG Chair/Exelon
Rob Whelan	BWROG/GEH
Tony Borger	BWROG/PPL Susq.
Jose L. Casillas	GEH
Daniel Fouts	BWROG/Entergy Operations
Lawrence Fleischer	GEH
Curt Robert	GEH
Douglas Pruitt*	AREVA NP, Inc.
Alan Meginnis*	AREVA NP, Inc.
Joe Golla	NRC
Matt Yoder	NRC
Ralph Architzel	NRC
John Lehning	NRC
Anthony Mendiola	NRC
Len Ward	NRC
Eric Miller	NRC
Gary Wang	NRC
Sher Bahadur	NRC
Stewart Bailey	NRC
George Thomas	NRC
Hanry Wagage	NRC

* Attended public portion of the meeting only.

ENCLOSURE 1

MEETING AGENDA

U.S. NUCLEAR REGULATORY COMMISSION (NRC)

MEETING WITH BOILING WATER REACTOR OWNER'S GROUP

November 17, 2010

8:30-8:45 a.m.	Introductions and Overview	NRC/BWROG
8:45-10:00 a.m.	Followup of Action Items from Previous Meetings	NRC/BWROG
10:00-10:15 a.m.	Break	
10:15-12:00 p.m.	Invessel downstream effects **this portion closed**	NRC/BWROG
12:00-1:00 p.m.	Lunch	
1:00-2:45 p.m.	Invessel Downstream Effects **this portion closed**	NRC/BWROG
2:45-3:00 p.m.	Break	
3:00-3:50 p.m.	Latent Debris	NRC/BWROG
3:50-4:50 p.m.	Debris Transport and Erosion	NRC/BWROG
4:50-5:00 p.m.	Opportunity for Public Comment	NRC/Public
5:00 p.m	Adjourn	

ENCLOSURE 2

Memorandum to Stewart N. Bailey from Joe Golla dated

SUBJECT: SUMMARY OF PUBLIC MEETING ON NOVEMBER 17, 2010, WITH THE BOILING WATER REACTOR OWNER'S GROUP

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John Jolicoeur
Melissa Ash
John Lehning
Robert Taylor
Anthony Mendiola
Stewart Bailey
Matthew Yoder
Sher Bahadur
Stephen Smith
Rob Whelan (Robert.Whelan@ge.com)