

BWR OWNERS' GROUP

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BWROG-07043
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John A. Grobe
Associate Director for Engineering and Safety Systems
Office of Nuclear Reactor Regulation
Washington, DC 20555-0001

Subject: BWROG comments on NRC Proposed Regulatory Issue Summary (RIS) to discuss potential adverse flow effects for power uprates and new reactors

Reference: Letter Subject "Potential Adverse Flow Effects in Nuclear Power Plants", dated July 17, 2007 from John A Grobe (NRR) to Randy Bunt (BWROG)

Thank you for the opportunity to comment on the "Potential Adverse Flow Effects in Nuclear Power Plants." As you mention in your letter of July 17, 2007 the US nuclear industry has and continues to evaluate the operating experience and design considerations relative to power uprate conditions including potential adverse flow effects from hydrodynamic loads and acoustic resonance. There are specific committees in both the BWROG and BWRVIP currently working on the potential adverse flow effects. The BWROG Extended Power Uprate committee has developed NEDO 33159, revision 1 to document the lessons learned in the uprate program for BWRs with regard to safety, efficiency and reliability. A large percentage of the US nuclear fleet has performed power uprate, and recent data from the industry and the NRC performance indicators show continued excellent improvement of availability and capability. Based on this experience the BWROG believes that if the RIS is issued, it should identify several other options that have been demonstrated at nuclear plants to comply with the requirements specified in the recently updated Regulatory Guide and Standard Review Plan (e.g. NEDO 33159).

The BWR Owners' Group has reviewed the proposed topics to be covered in the RIS and offers the following comments.

There are already several documents that address the proposed RIS topical areas (Regulatory Guide 1.20, "Comprehensive Vibration Assessment Program for Reactor Internals During Preoperational and Initial Startup Testing", the BWROG document NEDO 33159, R1 "Extended Power Uprate Lessons Learned and Recommendations", and the BWRVIP is developing technical guidance for Steam Dryer Integrity Demonstration). The BWROG believes the previously listed activities will adequately cover the issues listed in the RIS and no additional regulatory action is required at this time.

- 1. Pressure Fluctuations and Vibration in Plant Systems (including the construction and validation of a small SMT facility, and method and approach for the measurement of plant-specific data to determine pressure fluctuations and vibration that can impact structures, systems, and components).***

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NRR

2. ***Design Load Definition for Steam Dryers (including the development of an analytical methodology to calculate fluctuating pressure loads on the steam dryer that is validated against SMT data and plant-specific instrumented steam dryers)***
3. ***BWR Steam Dryer Stress and Limit Curves (including the performance of a finite element analysis using appropriate damping values, justification of bias error and uncertainty for each category of the stress calculation on a frequency-specific basis, and development of limit curves based on plant data accounting for bias errors and uncertainties as well as concentration and weld size factors).***

In response to NRC item 1-3

- a. The BWRVIP is currently in the process of developing a Steam Dryer Integrity Demonstration Guidance Document that will define an overarching approach for addressing this topic (Reference BWRVIP letter 2007-233 of August 9, 2007).
- b. The approach will allow the use of in-plant and sub-scale tests as well as analytical models to demonstrate the integrity of steam dryers at power uprate conditions. It will define key criteria, analysis assumptions, as well as benchmarking and documentation requirements for each methodology used to define steam dryer loads and evaluate structural integrity. It is the intent of the documents to comply with Regulatory Guide 1.20 issued in March 2007, although the scope of the document is limited to evaluation for steam dryer integrity and does not address vibration of components outside the reactor vessel. The loads developed from these methodologies could be applied to the evaluations performed for other components being evaluated under the NEDO document recommendations.
- c. The BWRVIP Guidance Document will be documenting a suite of technologies that can be used to demonstrate steam dryer integrity at power uprate conditions. This guide will document and justify methods to:
 - Screen to assess the potential for acoustic excitation in BWR main steam lines (MSL) at power uprate
 - Define MSL dynamic pressures derived from strain gauges located on MSLs
 - Define MSL dynamic pressures during tests involving the sequential closure of one main steam isolation valve to increase the flow velocity in the other three MSLs
 - Define the increase in MSL pressures (on a frequency specific basis) due to the increase MSL flow velocities at power uprate based on sub-scale testing and/or analysis
 - Define steam dryer stresses at power uprate.
- d. In addition, the BWRVIP will be submitting a Licensing Topical Report as defined in BWRVIP letter 2007-233 of August 9, 2007

4. ***PWR Steam Generator Stress and Design Margin (including the evaluation of the dynamic response, stress, and design margin of the internal components in steam generators)***

In response to NRC item 4

- a. Not addressed by BWROG

5. Evaluation of Other Plant Components (including the evaluation of potential adverse effects from pressure fluctuations and vibration on piping and components in reactor coolant, steam, feed water, and condensate systems, such as safety relief valves, power-operated valves, and sampling probes)

In response to NRC item 5

- a. Evaluation of anticipated power up-rate impacted non-dryer Plant Components were addressed in the BWROG document "Extended Power Up-rate Lessons Learned and Recommendations", NEDO 33159, R1 on Extended Power Up-rates/Power Up rate evaluations. The loads developed from the BWRVIP methodologies, discussed under item 1 above, could be applied to the evaluations performed for other components being evaluated under the NEDO document recommendations.

6. Power Ascension Data (including the development of power ascension procedures with limit curves and frequent data collection, walk downs, and hold points for data evaluation and NRC staff interaction)

In response to NRC item 6

- a. BWRVIP document will address these items for the steam dryer; see response to NRC items 1-3.
- b. The BWROG believes data should be taken during power ascension as information only points. Limits should be established for evaluation, but not considered NRC hold points.

7. Monitoring of Potential Adverse Flow Effects (including the development of proactive methods for identifying acoustic resonance or severe hydrodynamic loading prior to component failure)

In response to NRC item 7

- a. Monitoring is addressed in the BWROG document "Extended Power Uprate Lessons Learned and Recommendations", NEDO 33159, R1

The BWROG Extended Power Uprate Committee has been and will continue to work closely with the BWRVIP in addressing specific topics related to the BWR fleet. Based on the work completed or scheduled by the BWRVIP and BWROG Extended Power Uprate committee we feel there is no need for the NRC to initiate any new regulatory actions.

As referenced in letter 2007-233 of August 9, 2007, the BWRVIP looks forward to the opportunity to discuss the content of the above noted "Guidance Document" as well as the LTR with NRC in the near future. (Response to NRC items 1-3)

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If you have any questions please feel free to contact the undersigned at (205) 992-7475 or Ron Willems Project Manager of the Extended Power Uprate committee (910) 675-6076.

Sincerely,

A handwritten signature in black ink, appearing to read "R. C. Bunt". The signature is written in a cursive style with a large, stylized "R" and "B".

R. C. Bunt
BWR Owners Group, Chair

Cc: Kamal Manoly, NRR
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