



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001

ACRSR-2146

September 20, 2005

Mr. Luis A. Reyes  
Executive Director for Operations  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

SUBJECT: PROPOSED REVISION 4 TO REGULATORY GUIDE 1.82, "WATER SOURCES FOR LONG-TERM RECIRCULATION COOLING FOLLOWING A LOSS-OF-COOLANT ACCIDENT"

Dear Mr. Reyes:

During the 525<sup>th</sup> meeting of the Advisory Committee on Reactor Safeguards, September 8-10, 2005, we reviewed the proposed Revision 4 to Regulatory Guide (RG) 1.82, "Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident," and the supporting Standard Review Plan (SRP) Section 6.2.2, "Containment Heat Removal Systems." The review focused mainly on the issue of granting containment overpressure credit for calculation of net positive suction head (NPSH) for emergency core cooling and containment heat removal system pumps. During our review, we had the benefit of presentations by and discussion with representatives of the NRC staff and members of the public. We also had the benefit of the documents referenced.

## CONCLUSIONS AND RECOMMENDATIONS

1. Revision 4 to RG 1.82 should not be issued for public comment at this time and should be revised to improve clarity and reflect the following recommendation.
2. Containment overpressure credit to ensure sufficient NPSH for emergency core cooling and heat removal system pumps should only be selectively granted.

## DISCUSSION

One purpose of the proposed Revision 4 to RG 1.82 is to make it consistent with current regulatory practice for crediting containment accident pressure in calculating available NPSH for boiling water reactor (BWR) and pressurized water reactor (PWR) systems. As a part of this effort, SRP Section 6.2.2 would also be revised to reference RG 1.82 rather than RG 1.1, "Net Positive Suction Head for Emergency Core Cooling and Containment Heat Removal System Pumps." RG 1.1 would be designated as applicable only to those plants for which it was used as the basis for the original license.

RG 1.82 was first issued in 1974 to provide guidance on the design of PWR sumps which serve as a source of water during the recirculation core cooling phase of postulated design-basis loss-of-coolant accidents (LOCAs). Three revisions to RG 1.82 have been issued, one in November 1985, another in May 1996, and the most recent in November 2003. These revisions have addressed issues associated with containment emergency sump performance, particularly debris blockage on the emergency core cooling system suction strainers and granting credit for containment overpressure in determining NPSH available for the emergency core cooling and containment heat removal pumps.

Even though containment overpressure credit had been granted on an ad hoc basis before RG 1.1 was issued in 1974, Revision 3 to RG 1.82 issued in November 2003 was the first version to provide explicit guidance for granting limited use of containment accident pressure for calculating available NPSH. This guidance conflicts with the original guidance in RG 1.1, still in effect, which states that no such credit should be used. Not granting credit preserves the independence of the performance of the ECCS and containment systems.

The proposed Revision 4 to RG 1.82 includes provisions that permit licensees to use either a conservative deterministic approach or a best estimate with uncertainty analysis to establish the amount of containment overpressure to be credited.

We previously stated our position on granting containment overpressure credit in our December 12, 1997 letter (i.e., "selectively granting credit for small amounts of overpressure for a few cases may be justified") and more recently in our letter dated September 30, 2003. In that letter we recommended issuing Revision 3 to RG 1.82. That RG included a provision to grant, only where necessary, some containment accident pressure credit for some operating reactors with the caveat that "this should be minimized to the extent possible."

The position that the overpressure should be conservatively calculated is the only explicit restriction on the use of overpressure credit given in the proposed revision of the RG. In addition, the guidance describing what factors to consider in conservatively calculating containment overpressure, in Sections 1.3.1 and 2.1.1 of the proposed RG is confusing.

We believe that additional restrictive guidance should be placed on the granting of overpressure credit. Before such credit can be granted, licensees should demonstrate that there are no practical alternative approaches that can eliminate the need for such credit. Such credit should be granted only for robust containments for which there are positive means for indication of containment integrity such as inerted and sub-atmospheric containments. The time intervals for which such credit is needed should be limited to a few hours, commensurate with the demonstrated capability of all associated equipment to perform its intended functions during this time period. The RG should be revised to include such restrictions before it is released for public comment.

Dr. William Shack did not participate in the Committee's deliberations regarding this matter.

Sincerely,

**/RA/**

Graham B. Wallis  
Chairman

References:

1. Letter from Suzanne Black to John Larkins, "Proposed Revision to Regulatory Guide 1.82, Revision 3, "Water Sources for Long-term Recirculation Cooling Following a Loss-of-Coolant Accident (LOCA)", June 3, 2005
2. Letter from James E. Lyons to John Larkins, "Proposed Revision to Regulatory Guide 1.82, Revision 3, "Water Sources for Long-term Recirculation Cooling Following a Loss-of-Coolant Accident (LOCA)", September 6, 2005
3. Letter from David O'Brien to Mario Bonaca, "State of Vermont Request to Consider the Containment Overpressure Credit Policy", September 17, 2004
4. B. R. Hobbs, et. al., "Vermont Yankee Extended Power Uprate Feasibility Study", June 28, 2002
5. "Learning about Pump NPSH Margin", <http://www.pumps.org/public/pump> resources, February 28, 2005
6. T. Henshaw, "How Much NPSH Does Your Pump Really Require?", [www.pump-zone.com](http://www.pump-zone.com), September 2001, page 42
7. P. Cooper, et. al., "Checking In," [www.pump-zone.com](http://www.pump-zone.com), January, 2002, p. 8
8. R. Lueneberg, Sulzer-Bingham Pumps Inc., "NPSH/Minimum Flow Study - Summary, F-97-10782(30P59)", May 1, 1998
9. L. Lukens, "MSIV As-Found LLRTs Show An Adverse Trend - Adverse Trend Common Cause Analysis", CR-VTY-2004-0918, May 5, 2004

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Graham B. Wallis  
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