

November 9, 2015

Ms. Lesa P. Hill, Chairman
Boiling Water Reactor Owners' Group
Southern Nuclear Operating Company
c/o GE Hitachi Nuclear Energy
P.O. Box 780
3901 Castle Hayne Road, M/C F-12
Wilmington, NC 28402

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RE: BOILING WATER
REACTOR OWNERS' GROUP TOPICAL REPORT NEDC-33347P,
REVISION 1, "CONTAINMENT OVERPRESSURE CREDIT FOR NET
POSITIVE SUCTION HEAD (NPSH)" (TAC NO. MF6708)

Dear Ms. Hill:

By letter dated November 21, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14325A626), the Boiling Water Reactor Owners' Group (BWROG) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review Topical Report NEDC-33347P, Revision 1, "Containment Overpressure Credit for Net Positive Suction Head (NPSH)." Upon review of the information provided, the NRC staff has determined that additional information is needed to complete the review. On November 2, 2015, BWROG Project Manager, Kenneth Welch, agreed that the NRC staff will receive your response to the enclosed Request for Additional Information (RAI) questions by December 28, 2015.

If you have questions regarding this matter, please contact Jason Drake at 301-415-8378 or via e-mail at Jason.Drake@nrc.gov.

Sincerely,

/RA/

Kevin Hsueh, Chief
Licensing Processes Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Project No. 691

Enclosure:
RAI Questions

Ms. Lesa P. Hill, Chairman
 Boiling Water Reactor Owners' Group
 Southern Nuclear Operating Company
 c/o GE Hitachi Nuclear Energy
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Enclosure:
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REQUEST FOR ADDITIONAL INFORMATION

OFFICE OF NUCLEAR REACTOR REGULATION

NEDC-33347P, REVISION 1, "CONTAINMENT OVERPRESSURE CREDIT FOR NET POSITIVE

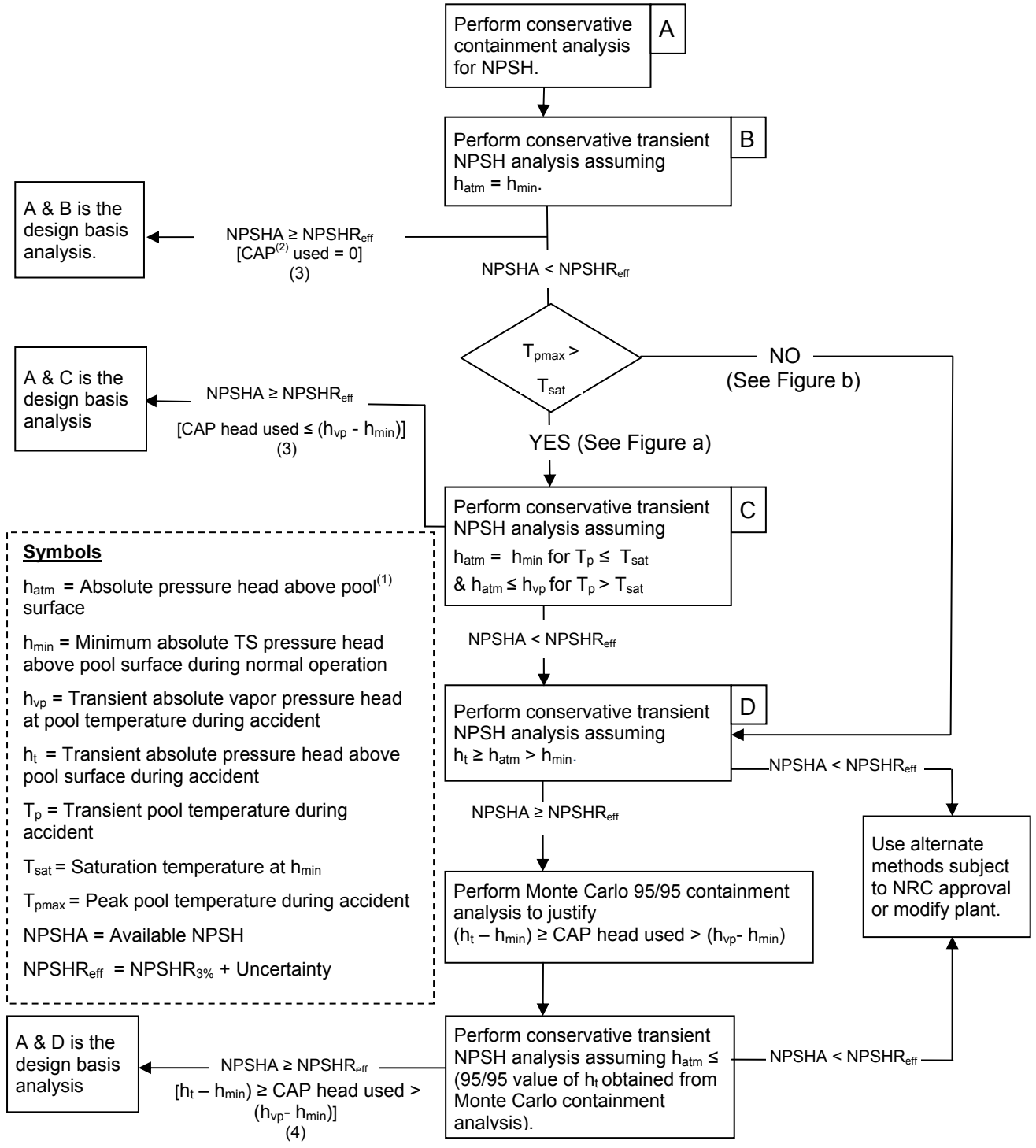
SUCTION HEAD (NPSH)"

BOILING WATER REACTOR OWNERS' GROUP

PROJECT NO. 691

The Nuclear Regulatory Commission (NRC) staff has the following requests for the topical report NEDC-33347P, Revision 1 (Reference 1):

1. SECY-11-0014, "Use of Containment Accident Pressure in Reactor Safety Analysis," Enclosure 1 (Reference 4), Section 1.0, page 2, states that "containment overpressure" was an earlier term used for the pressure developed inside the containment during an accident. The NRC staff decided to replace this term with "containment accident pressure" for two reasons: (1) the industry uses several definitions of containment overpressure, and (2) it has been confused with over-pressurizing the containment. The containment design pressure is never exceeded while crediting the pressure developed during an accident. The staff requests either of the following:
 - (a) Replace the term "Containment Overpressure" with "Containment Accident Pressure" in the title and throughout the topical report.
 - (b) Add a statement in Section 1.0, "Introduction," indicating that the term "Containment Overpressure" is meant to be "Containment Accident Pressure," which are defined as the pressure developed inside the containment during a design-basis accident or a special event.
2. The revised draft safety evaluation report (SER) sent by letter dated March 10, 2010 (Reference 3), was issued after the NRC staff resolved the Boiling Water Reactor Owners' Group (BWROG) comments on the draft SER transmitted by letter dated September 29, 2009 (Reference 2). The Figure 2, "Flow Diagram for Deterministic and Statistical Containment Analysis Approved by the NRC staff," in the revised draft SER (Reference 3), has been modified and will be replaced in the final SER with Figures 1, a, and b, as enclosed, which define the containment analysis licensing bases for use of containment accident pressure approved by the NRC staff. These Figures are the same as those provided to the BWROG in letter dated February 25, 2013 (Reference 7). Please provide your comment on factual errors or clarity concerns contained in these Figures.



Symbols

h_{atm} = Absolute pressure head above pool⁽¹⁾ surface

h_{min} = Minimum absolute TS pressure head above pool surface during normal operation

h_{vp} = Transient absolute vapor pressure head at pool temperature during accident

h_t = Transient absolute pressure head above pool surface during accident

T_p = Transient pool temperature during accident

T_{sat} = Saturation temperature at h_{min}

T_{pmax} = Peak pool temperature during accident

NPSHA = Available NPSH

NPSHR_{eff} = NPSHR_{3%} + Uncertainty

Notes

1. Pool refers to suppression pool for BWRs.
2. Containment accident pressure (CAP) is defined as the transient absolute pressure developed above pool surface during the accident minus the minimum allowed technical specification (TS) absolute pressure above pool surface during normal operation; therefore CAP head available = $(h_t - h_{min})$
3. Containment leakage monitoring for a pre-existing leak during normal operation is not required.
4. Containment leakage monitoring for a pre-existing leak during normal operation is required.

FIGURE 1: FLOW CHART FOR LOCA CONTAINMENT AND NPSH ANALYSES

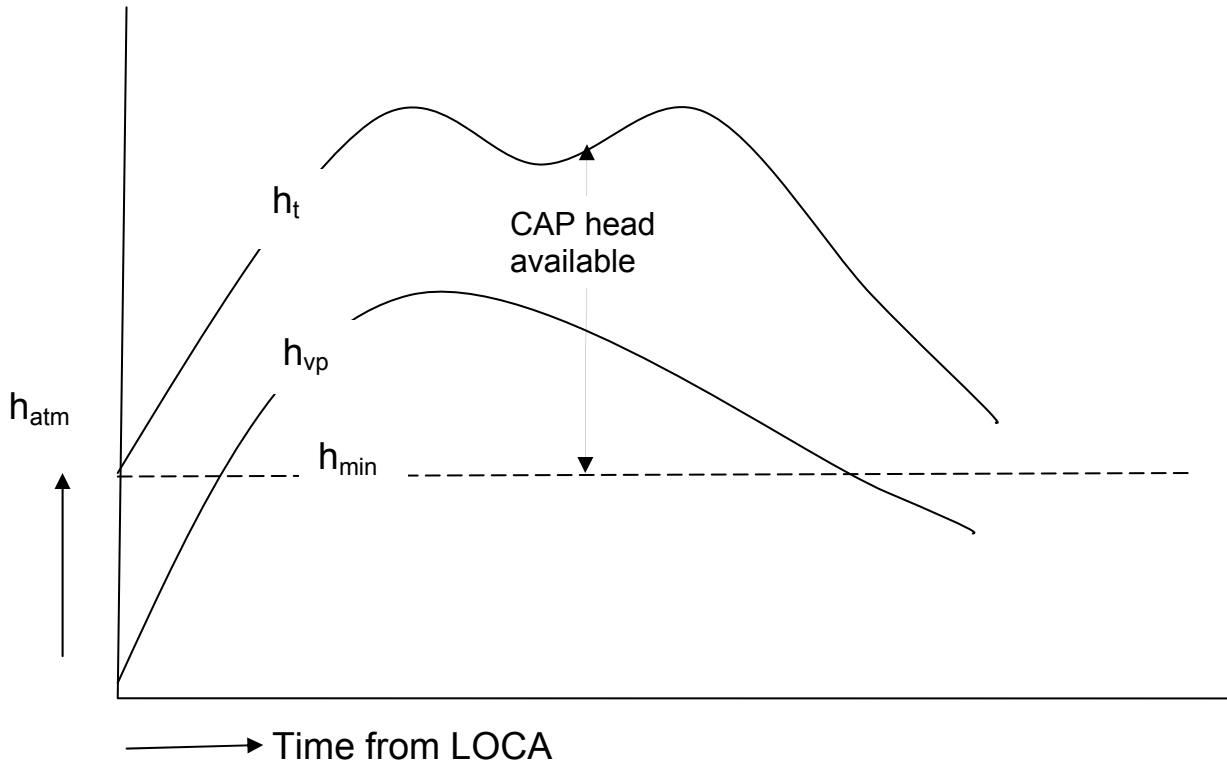


Figure a: Illustration of ' h_{atm} ' and 'CAP Head Available' for $T_{pmax} > T_{sat}$

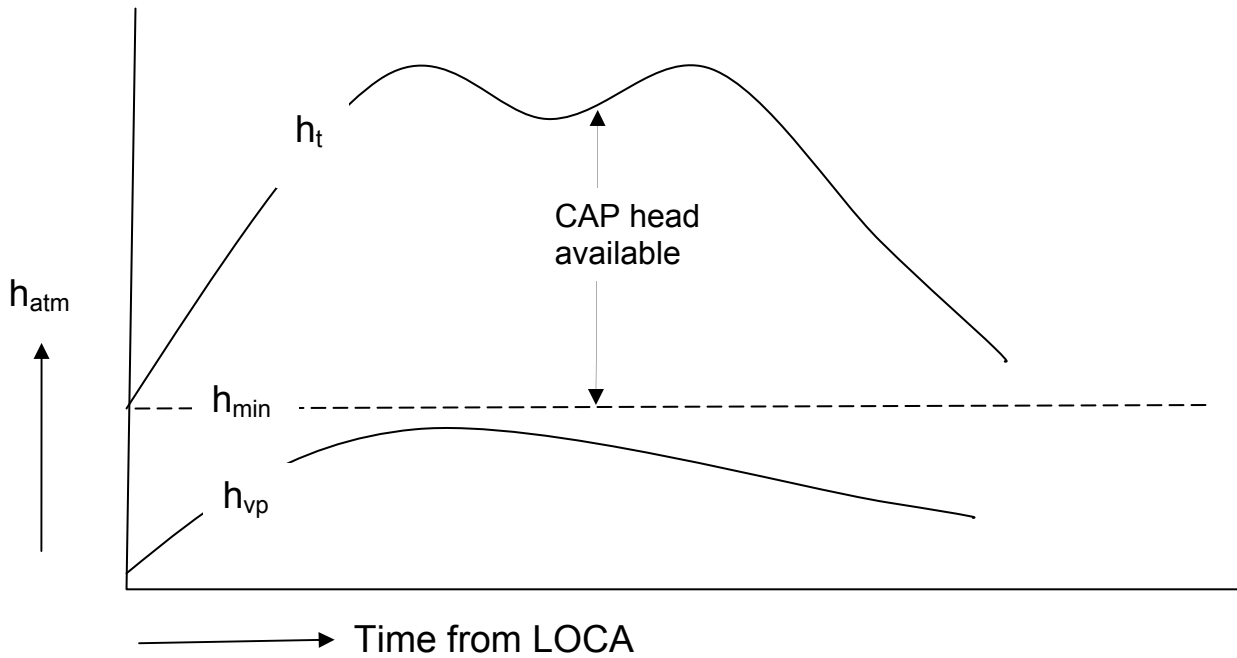


Figure b: Illustration of ' h_{atm} ' and 'CAP Head Available' for $T_{pmax} < T_{sat}$

REFERENCES

1. Letter from Boiling Water Reactor Owners' Group (BWROG) to NRC dated November 21, 2014, "Submittal of Revised BWROG Topical Reports NEDC-33347P, Revision 1 (Proprietary Version), and NEDO-33347, Revision 1 (Non-Proprietary Version), "Containment Overpressure Credit for Net Positive Suction Head (NPSH)"" (ADAMS Accession No. ML14325A626).
2. Letter from NRC to BWROG dated September 29, 2009, "Draft Safety Evaluation of Boiling Water Reactors Owners' Group (BWROG) Topical Report NEDC-33347, Revision 0, 'Containment Overpressure Credit for Net Positive Suction Head (NPSH)' (TAC No. MD8146)" (ADAMS Accession No. ML092440176).
3. Letter from NRC to BWROG dated March 10, 2010, "Revised Draft Safety Evaluation of Boiling Water Reactors Owners' Group (BWROG) Topical Report NSEDC-33347, Revision 0, "Containment Overpressure Credit for Net Positive Suction Head (NPSH)" (TAC No. MD8146)" (ADAMS Accession No. ML100680573).
4. SECY-11-0014, Enclosure 1, "Use of Containment Accident Pressure in Reactor Safety Analysis" (ADAMS Accession No. ML102110167).
5. Letter from BWROG to NRC dated October 24, 2012, "Submittal of BWROG Technical Reports Addressing the NRC Guidance Document on the Use of Containment Accident Pressure (CAP) in Analyzing Emergency Core Cooling System (ECCS) and Containment Heat Removal System Pump Performance in Postulated Accidents" (ADAMS Accession No. ML123000308).
6. Letter from BWROG to NRC dated March 18, 2014, "Submittal of BWROG Technical Reports Addressing the NRC Guidance Document on the Use of Containment Accident Pressure (CAP) in Analyzing Emergency Core Cooling System (ECCS) and Containment Heat Removal System Pump Performance in Postulated Accidents – CVIC Pumps" (ADAMS Accession No. ML14077A088).
7. Letter from NRC to BWROG dated February 25, 2013, "Use of Containment Accident Pressure in Demonstrating Acceptable Operation of Emergency Core Cooling System and Containment Heat Removal Pumps During Postulated Accidents" (ADAMS Accession No. ML13016A013).