

January 21, 2015

MEMORANDUM TO: Brian E. Thomas, Director
Division of Engineering
Office of Nuclear Regulatory Research

FROM: Lawrence E. Kokajko, Director */RA/*
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

SUBJECT: RESULTS OF PERIODIC REVIEW OF REGULATORY
GUIDE 1.82

This memorandum documents the U.S. Nuclear Regulatory Commission (NRC) periodic review of Regulatory Guide (RG) 1.82, "Water Sources for Long-Term Recirculation Cooling Following a Loss-Of-Coolant Accident," published in March 2012. The RG describes methods that the NRC staff considers acceptable for use in implementing requirements regarding the sumps and suppression pools that provide water for emergency core cooling, containment heat removal, or containment atmosphere cleanup systems. It also provides guidelines for evaluating the adequacy and the availability of the sump or suppression pool for long-term recirculation cooling following a loss-of-coolant accident.

As discussed in Management Directive 6.6, "Regulatory Guides," the NRC staff reviews RGs approximately every five years to ensure that the RGs continue to provide useful guidance. The scheduled five year review of RG 1.82 is July 2015. However, a partial review of RG 1.82 was performed to support the withdrawal of RG 1.1, "Net Positive Suction Head for Emergency Core Cooling and Containment Heat Removal System Pumps," published in November 1970. The documentation of the NRC staff review is enclosed.

Based on the results of the periodic review, the staff concludes that a revision to RG 1.82 is warranted. The staff currently plans to further review RG 1.82 in July 2015 in preparation for the update.

Enclosure:
Regulatory Guide Periodic Review

CONTACT: Leslie T. Perkins, NRR/DPR
(301) 415-2375

MEMORANDUM TO: Brian E. Thomas, Director
 Division of Engineering
 Office of Nuclear Regulatory Research

FROM: Lawrence E. Kokajko, Director */RA/*
 Division of Policy and Rulemaking
 Office of Nuclear Reactor Regulation

SUBJECT: RESULTS OF PERIODIC REVIEW OF REGULATORY
 GUIDE 1.82

This memorandum documents the U.S. Nuclear Regulatory Commission (NRC) periodic review of Regulatory Guide (RG) 1.82, "Water Sources for Long-Term Recirculation Cooling Following a Loss-Of-Coolant Accident," published in March 2012. The RG describes methods that the NRC staff considers acceptable for use in implementing requirements regarding the sumps and suppression pools that provide water for emergency core cooling, containment heat removal, or containment atmosphere cleanup systems. It also provides guidelines for evaluating the adequacy and the availability of the sump or suppression pool for long-term recirculation cooling following a loss-of-coolant accident.

As discussed in Management Directive 6.6, "Regulatory Guides," the NRC staff reviews RGs approximately every five years to ensure that the RGs continue to provide useful guidance. The scheduled five year review of RG 1.82 is July 2015. However, a partial review of RG 1.82 was performed to support the withdrawal of RG 1.1, "Net Positive Suction Head for Emergency Core Cooling and Containment Heat Removal System Pumps," published in November 1970. The documentation of the NRC staff review is enclosed.

Based on the results of the periodic review, the staff concludes that a revision to RG 1.82 is warranted. The staff currently plans to further review RG 1.82 in July 2015 in preparation for the update.

Enclosure:
 Regulatory Guide Periodic Review

CONTACT: Leslie T. Perkins, NRR/DPR
 (301) 415-2375

DISTRIBUTION:

LKokajko AMohseni AMendiola BThomas TBoyce
 LPerkins HCruz ASallman RDennig RJervey

ADAMS Accession No: ML14345A333

OFFICE	NRR/DPR	NRR/DPR	NRR/DPR	NRR/DPR	NRR/DPR
NAME	LPerkins	DHarrison	AMendiola	AMohseni	LKokajko
DATE	12/15/2014	1/13/2015	12/15/2014	12/23/2014	1/21/2015

OFFICIAL RECORD COPY

Regulatory Guide Periodic Review

Regulatory Guide Number: **1.82**

Title: **WATER SOURCES FOR LONG-TERM RECIRCULATION COOLING FOLLOWING A LOSS-OF-COOLANT ACCIDENT**

Office/division/branch: **NRR/DSS/SCVB**
Technical Lead: **Ahsan Sallman**

Recommended Staff Action: **Revise**

1. What are the known technical or regulatory issues with the current version of the Regulatory Guide (RG)?

The scheduled five year review of RG 1.82 is July 2015. A partial review of RG 1.82 is being performed to support the withdrawal of RG 1.1, "Net Positive Suction Head for Emergency Core Cooling and Containment Heat Removal System Pumps." However to assure users of RG 1.1 and RG 1.82 are aware of information pertaining to the subject, this review is being taken and is made available on the U.S. Nuclear Regulatory Commission (NRC) website.

RG 1.1 was published in November 1970. Its regulatory guidance states simply that "Emergency core cooling and containment heat removal systems should be designed so that adequate net positive suction head (NPSH) is provided to system pumps assuming maximum expected temperatures of pumped fluids and no increase in containment pressure from that present prior to postulated loss of coolant accidents." Thus credit for the increase in containment atmospheric pressure during an accident such as a loss-of-coolant accident should not be used to demonstrate satisfactory resultant NPSH for emergency core cooling systems (ECCS) pumps, but instead conservatively ignore that factor when calculating NPSH adequacy.

RG 1.82 refers to containment accident pressure credit to increase NPSH to that needed for adequate capability in limited instances, has been found acceptable by the staff, and would be considered in the future subject to careful consideration of the use of the credit.

This apparent conflict is explained thoroughly in SECY-11-0014, "Use of Containment Accident Pressure in analyzing Emergency Core Cooling System and Containment Heat removal System Pump Performance in Postulated Accidents" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML102590196) published in January 2011. Of the options provided to the Commission in SECY-11-0014, they chose Option one and responded in a staff requirements memorandum (SRM) (ADAMS Accession No. ML110740254) on March 15, 2011, as such. "The staff should evaluate current extended power uprate (EPU) applications, as well as future applications for new or increased credit for containment accident pressure (CAP), consistent with staff

ENCLOSURE

practice in implementing the current risk review guidance (Standard Review Plan Section 19.2), including the review of non risk-informed applications such as EPU and the recently-developed deterministic guidance based on recommendations of the Advisory Committee on Reactor Safeguards (ACRS) to include uncertainty and margins in CAP calculations.” Revision 4 to RG 1.82 was issued as a draft in July 2010, and published in March 2012 as final. This was during the time that NRC staff was considering needed changes to address implementing the changes asked for by the Commission in the SRM to SECY-11-0014. Of the many changes in the RG 1.82, Rev. 4, most were incorporated to update developments and lessons learned in the resolution of generic safety issue (GSI)-191, related to sump clogging. There is also the detailed consideration of NPSH, as necessary to understand its importance to calculation of many associated requirements. As part of the resolution, RG 1.82, Rev. 4, included the verbiage of RG 1.1 as staff regulatory guidance. In RG 1.82, Rev 4, it was noted that actions were underway to resolve the apparent conflict between RG 1.1 and RG 1.82 regarding the use of accident pressure for NPSH calculations in footnote four, “The staff is in the process of implementing SRM SECY-11-0014.... which addresses CAP and ECCS pump NPSH. Additional guidance for review of information in license amendments and applications regarding CAP is available in draft form in letters transmitted to the boiling-water reactor owners group and pressurize-water reactor owners group. This draft guidance will be augmented by work in progress as of issuance of the RG and revised guidance will be issued in the future.”

To further clarify the considerations related to taking containment accident pressure credit, additional changes are expected to be made in the RG 1.82 guidance during the next planned revision in addition to updating the document to incorporated lessons learned from GSI-191.

2. What is the impact on internal and external stakeholders of not updating the RG for the known issues, in terms of anticipated numbers of licensing and inspection activities over the next several years?

There are several licensing actions, such as power uprate amendments and recirculating sump changes which may indicate a need for allowing the use of CAP. These are infrequent, but it is expected that two to three may occur over the next year. The people researching these activities will need to account for the Commission’s decision with the clarifications provided as needed to successfully complete an amendment which demonstrates the need for CAP credit.

3. What is an estimate of the level of effort needed to address identified issues in terms of full-time equivalent (FTE) and contractor resources?

The changes required to RG 1.82 will require 0.25 technical FTE and 200 hours administrative time over the course of a year to make the changes to RG 1.82 in the next revision.

4. **Based on the answers to the questions above, what is the staff action for this guide (Reviewed with no issues identified, Reviewed with issues identified for future consideration, Revise, or Withdraw)?**

RG 1.82 was reviewed with issues identified for future consideration. RG 1.82 should be revised, but can be used in the interim by subject matter experts as guidance for related license amendments. Since the Commission has determined a path forward allowing the use of CAP, RG 1.1 should be withdrawn. Its guidance has been incorporated into RG 1.82 and the apparent conflict between the guidance provided in these two documents will then be eliminated.

5. **Provide a conceptual plan and timeframe to address the issues identified during the review.**

Further review will be performed in July 2015 in preparation for update to RG 1.82.

NOTE: This review was conducted in June 2014 and reflects the staff's plans as of that date. These plans are tentative and subject to change.