REGULATORY ANALYSIS

DRAFT REGULATORY GUIDE DG-1385
WATER SOURCES FOR LONG-TERM RECIRCULATION COOLING FOLLOWING A LOSS-OF-COOLANT ACCIDENT

(Proposed Revision 5 of Regulatory Guide 1.82, Revision 4, March 2012)

1. Introduction

This document presents the results of a regulatory analysis of the U.S. Nuclear Regulatory Commission's (NRC's) determination of whether to revise Regulatory Guide (RG) 1.82, "Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident." The analysis gives the public insight into how the NRC arrives at a decision.

2. Statement of the Problem

The NRC is considering revising RG 1.82 by adding an appendix, Appendix B, to incorporate the guidance 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," dated January 31, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML102780586 (package)). To ensure adequate suction conditions for the emergency core cooling system (ECCS) and containment heat removal pumps during postulated design-basis accidents (DBAs) and certain postulated non-DBAs (or special events), the Commission approved the guidance on the use of containment accident pressure (CAP) in Staff Requirements Memorandum (SRM)-SECY-11-0014, "Staff Requirements—SECY-11-0014—Use of Containment Accident Pressure in Analyzing Emergency Core Cooling System and Containment Heat Removal System Pump Performance in Postulated Accidents," dated March 15, 2011 (ADAMS Accession No. ML110740254). The staff should follow this guidance when reviewing licensees' and applicants' use of CAP in calculating the available net positive suction head (NPSH) for the ECCS and containment heat removal pumps. Licensees and applicants should apply this guidance fully or, if partially, with proposed alternatives acceptable to the staff.

The NRC published Revision 4 of RG 1.82 in March 2012, to ensure that as part of their reactor safety analyses, licensees would demonstrate that the ECCS and containment heat removal pumps would perform the following safety functions:

- delivering "abundant flow," as required by General Design Criterion (GDC) 35, "Emergency core cooling," in Appendix A, "General Design Criteria for Nuclear Power Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities"

- rapidly reducing the containment pressure and temperature, as required by GDC 38, "Containment heat removal"

To satisfy the requirements of 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," the ECCS pumps must perform their safety functions during a loss-of-coolant accident. Revision 4 of RG 1.82 informed licensees and applicants of two items:

(1) The staff was in the process of implementing SRM-SECY-11-0014, which addresses CAP used for ECCS and containment heat removal pumps NPSH.

(2) The guidance for review of information on CAP in license amendment requests and applications was available in draft form in letters transmitted on February 25, 2013, to the Boiling-Water Reactor Owners' Group (ADAMS Accession No. ML13016A013) and to the Pressurized-Water Reactor Owners' Group (ADAMS Accession No. ML13017A434). This guidance would be augmented by work that was in progress as of the issuance of Revision 4 of RG 1.82.

3. Objective

The objective of this regulatory action is to update NRC guidance on acceptable methods to demonstrate compliance with the requirements in GDC 35 and 38, which state that the ECCS and containment heat removal pumps must have adequate available NPSH while using CAP, must perform their safety functions for mitigation of DBAs and non-DBAs, and must satisfy 10 CFR 50.46.

The revision of this RG to endorse portions of a consensus standard is consistent with the NRC policy of evaluating the latest versions of national consensus standards to determine their suitability for endorsement by RGs. This action also complies with Management Directive 6.5, "NRC Participation in the Development and Use of Consensus Standards," dated October 28, 2016 (ADAMS Accession No. ML16193A497). This is in accordance with the National Technology Transfer and Advancement Act of 1995 (Public Law 104-113).

4. Identification and Analysis of Alternative Approaches

The NRC staff considered the following alternative approaches:

(1) Do not revise RG 1.82.
(2) Withdraw RG 1.82.
(3) Revise RG 1.82 to address the current methods and procedures.

Alternative 1: Do Not Revise Regulatory Guide 1.82

Under this alternative, the NRC would not issue additional guidance, and the current guidance would be retained. In this case, there would be no changes in costs or benefit to the public, licensees, or the NRC. This alternative is considered the "no-action" alternative and provides a baseline condition from which any other alternatives will be assessed. Under the no-action alternative, there would be no NRC guidance on the use of CAP in the NPSH calculation for the ECCS and containment heat removal pumps to comply with 10 CFR 50.46 and with GDCs 35 and 38. The NRC would continue to review applications on a case-by-case basis.

Alternative 2: Withdraw Regulatory Guide 1.82

Under this alternative, the NRC would withdraw RG 1.82. This would eliminate the problems with the RG identified above. However, it would also eliminate the only readily available description of the methods the NRC staff considers acceptable for demonstrating compliance with 10 CFR 50.46 and GDC 35 and 38. Although this alternative may be less costly

than Alternative 3, it would reduce regulatory certainty and efficiency in licensing reviews and would impede the public's access to the most current regulatory guidance.

Alternative 3: Revise Regulatory Guide 1.82

Under this alternative, the NRC would revise RG 1.82, adding Appendix B to incorporate the latest information on the use of CAP. This would ensure that the regulatory guidance in this area is current and accurately reflects the staff's position.

The impact to the NRC would be the costs associated with preparing and issuing the revision. The impact to the public would be the voluntary costs associated with reviewing the revision and providing feedback to the NRC during the public comment period. The value to the NRC staff and its licensees and applicants would lie in enhanced efficiency and effectiveness due to the use of a common guidance document as the technical basis for license applications and other interactions between the NRC and its regulated entities.

5. Comparison of Alternatives

The staff compared the three alternatives with respect to safety, the NRC's resources, and the resources of applicants and licensees.

With respect to safety, Alternatives 1 and 2 would not entail unsafe results, since the NRC staff would evaluate applicants' and licensees' methods case by case to establish reasonable assurance of safety. Under Alternative 3, the updated guidance would allow applicants and licensees to demonstrate compliance with the applicable regulations.

With respect to resources, under Alternative 1, the NRC staff would need to issue requests for additional information (RAIs) to applicants and licensees to address the identified concerns. Applicants and licensees would thus incur the costs of responding to the RAIs, and the NRC staff would incur the costs of reviewing them. Under Alternative 2, the lack of formal guidance would force applicants and licensees to develop methods to demonstrate compliance that satisfy the NRC. This would require more resources than if there were guidance. Of the three alternatives, Alternative 3 represents the greatest initial cost to the NRC, namely the cost of updating and issuing a revised RG. However, the staff estimates that over the lifetime of the RG, Alternative 3 would have a lower overall cost to the NRC than Alternative 1 or 2, since it would reduce the need for RAIs and the associated staff resources and schedule impacts. Applicants and licensees would benefit from not having to develop their own methods to demonstrate compliance and from not needing to respond to RAIs in these areas.

6. Decision Rationale

Based on this regulatory analysis, the NRC staff concludes that revision of RG 1.82 is warranted. The action will provide guidance on the use of CAP in calculating the adequate available NPSH for the ECCS and containment heat removal pumps to mitigate DBAs and non-DBAs. It may also lead to industry cost savings, especially for power uprate license amendments for existing plants and for applications for standard plant design certifications and combined licenses under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants."