

RULEMAKING ISSUE NOTATION VOTE

May 13, 2002

SECY-02-0080

FOR: The Commissioners

FROM: William D. Travers
Executive Director for Operations

SUBJECT: PROPOSED RULEMAKING—RISK-INFORMED 10 CFR 50.44,
“COMBUSTIBLE GAS CONTROL IN CONTAINMENT” (WITS 20010003)

PURPOSE:

To obtain Commission approval to publish the proposed rule and the draft regulatory guidance implementing the proposed rule.

BACKGROUND:

In SECY-01-0162, “Staff Plans for Proceeding with the Risk-informed Alternative to the Standards for Combustible Gas Control Systems in Light-Water-Cooled Power Reactors in 10 CFR 50.44,” dated August 23, 2001, the staff recommended revising the existing regulations rather than developing a voluntary alternative. In an SRM dated December 31, 2001, the Commission approved the staff’s recommendation and requested that the staff explain why installing passive autocatalytic recombiners would not pass a cost benefit test.

Mr. Christie, of Performance Technology, Inc., submitted letters, dated October 7 and November 9, 1999, requesting changes to the regulations in § 50.44. The staff has treated Mr. Christie’s request as a petition for rulemaking (Docket No. PRM-50-68). The NRC published a notice requesting comment on the petition in the *Federal Register* on January 12, 2000 (65 FR 1829). The staff discussed issues raised by the petitioner in SECY-00-0198, “Status Report on Study of Risk-Informed Changes to the Technical Requirements of 10 CFR Part 50 (Option 3) and Recommendations on Risk-Informed Changes to 10 CFR 50.44 (Combustible Gas Control).

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The Commission also received a petition for rulemaking from the Nuclear Energy Institute. The petition was docketed on April 12, 2000 (Docket No. PRM-50-71). The staff published a notice requesting comment on the petition in the *Federal Register* on May 30, 2000 (65 FR 34599). The petitioner requested that the NRC amend its regulations to allow nuclear power plant licensees to use zirconium-based cladding materials other than zircaloy or ZIRLO, provided the cladding materials meet the requirements for fuel cladding performance and have been approved by the NRC staff. The petitioner believes the proposed amendment would improve the efficiency of the regulatory process by eliminating the need for licensees to obtain individual exemptions to use advanced cladding materials which have already been approved by the NRC.

DISCUSSION:

Since the 1987 revision of 10 CFR 50.44, "Standards for combustible gas control system in light-water-cooled power reactors," there have been significant advances in our understanding of the risk to nuclear power plants, in particular, risk arising from the production and combustion of hydrogen (and other combustible gases) in the spectrum of reactor accidents. These advances are described in SECY-00-0198, "Status Report on Study of Risk-Informed Changes to the Technical Requirements of 10 CFR Part 50 (Option 3) and Recommendations on Risk-Informed Changes to 10 CFR 50.44 (Combustible Gas Control)." This new understanding has led to a reconsideration of the bases for the requirements in 10 CFR 50.44. A portion of this reconsideration is the proposed "rebaselining" of 50.44, as described in SECY-01-0162. This led to the staff recommendation and subsequent Commission approval to update the existing rule which represents the most complete, expeditious, and efficient approach for updating the regulations.

Proposed Rule

The proposed rule, attached herein, retains existing requirements for ensuring a mixed atmosphere, inerting Mark I and II containments, and hydrogen control systems capable of accommodating an amount of hydrogen generated from a metal-water reaction involving 75 percent of the fuel cladding surrounding the active fuel region in Mark III and ice condenser containments¹. The proposed rule also retains the existing analysis requirements and equipment survivability requirements for Mark III and ice condenser containments. The proposed rule eliminates the design-basis LOCA hydrogen release from § 50.44 and consolidates the requirements for hydrogen and oxygen monitoring into § 50.44 while relaxing safety classifications and licensee commitments to certain design and qualification criteria. The proposed rule also relocates without change the hydrogen control requirements in § 50.34(f) to § 50.44 for future applicants and licensees. The proposed rule also relocates the high point vent requirements from § 50.44 to § 50.46a with a change that eliminates a requirement prohibiting venting the reactor coolant system if it could "aggravate the challenge

¹The Feasibility Study, in SECY-00-0198, indicated that some mitigative features may need to be enhanced beyond current requirements which was identified as Generic Issue (GI)-189. The resolution of GI-189 will assess whether improvements to safety can be achieved and the costs and benefits of enhancing combustible gas control requirements for Mark III and ice condenser containment designs. The resolution of GI-189 is proceeding independently of this rulemaking. The technical basis for this issue is now under study and will be discussed in June 2002 with the ACRS.

to containment.” The proposed rule addresses Mr. Christie’s petition and addresses the § 50.44 portion of the NEI petition. Lastly, the proposed guidance reflects changes in the proposed rule, including related changes that allow removal of oxygen and hydrogen monitors from the technical specifications.

Stakeholder Feedback on Draft Rule Language

On November 14, 2001, the staff published the draft rule language on the NRC Rulemaking Web site, along with an explanation of the intent of the rule and its guidance. The NRC received comments from seven members of the public (including the two petitioners), four utilities, and a law firm that represents the Nuclear Utility Group on Equipment Qualification. The comments supported the draft proposed rule language and praised the staff’s efforts to produce “more effective and efficient regulation with respect to combustible gas in containment.” Comments that resulted in substantive changes in rule language are addressed in the subject sections of the statement of considerations in the *Federal Register* notice (Attachment 1). The staff also considered information in licensee exemption submittals (discussed below), the two petitions for rulemaking, and the Boiling Water Reactor Owners Group (BWROG) topical report (discussed below).

When the staff published the draft rule language, the staff requested comments on two issues. First, the staff requested comment on the need to maintain the prescriptive ASME Code references versus a more performance-based approach. Based upon stakeholder feedback, the proposed rule eliminates the prescriptive ASME references by incorporating a performance-based approach with the attached regulatory guide accepting the ASME approach as one way of satisfying the intent of the regulations. The proposed rule, thus, simplifies the regulations.

The staff requested comments on the utility of maintaining post-accident inerting as a means of combustible gas control. No currently licensed facility or new reactor design uses this alternative to control combustible gases. The major concerns with post-accident inerting of containment are its expense and issues associated with its adverse effects and actuation. Stakeholder feedback during public meetings and in the comments received on the draft rule language supported elimination of this option. Based upon staff experience and stakeholder input, the staff decided to revise the draft rule language to eliminate the requirements applicable to the post-accident inerting which further simplifies the regulations.

Implications of Removal of ASME Code References and Post-Accident Inerting

Removal of the ASME Code references² would allow a challenge in any licensing proceeding when the licensee or applicant proposes to comply with the rule by complying with the ASME Code. Currently, such challenges would not ordinarily be litigable under 10 CFR 2.758. Likewise, should a future applicant (including for design approval or design certification) choose to use post-accident inerting, criteria for acceptability of the design would have to be developed by the NRC and would be subject to challenge in the licensing or design certification rulemaking proceedings. Currently, such challenges would not ordinarily be litigable in a licensing hearing or raised in a design certification rulemaking.

²As regulations become more performance-based, prescriptive information will be removed from the regulations. This information, previously approved in a public process, rulemaking, would be subject to challenge in a licensing proceeding.

Contents of the Proposed-Rulemaking Package

This rulemaking package provides a comprehensive package for Commission consideration. It includes the *Federal Register* notice with the proposed rule (Attachment 1) and the regulatory analysis (Attachment 2). The package also includes the draft regulatory guide (Attachment 3), the draft revision of the standard review plan (Attachment 4), and a model safety evaluation and proposed changes to the standard technical specifications (Attachments 5 and 6). The staff will solicit stakeholder input on these supporting documents at the same time as comments on the proposed rule so that the documents are ready to be issued when the final rule is sent to the Commission.

Exemption and Relief Requests for Hydrogen Control Systems

As discussed in SECY-01-0162, the staff plans to continue processing all licensing requests and requests for exemption or relief consistent with the normal priorities for such actions. The staff will give rulemaking the highest priority since it is the most efficient process for providing the relief consistent with the NRC's strategic and performance goals. The staff received and processed two exemption requests from licensees during the preparation of the proposed rule.

Cost-Benefit Analysis of Passive Autocatalytic Recombiners (PARs)

In the SRM dated December 31, 2001, the Commission directed the staff to provide an explanation why PARs would not pass a cost-benefit test.

The staff prepared a value-impact analysis for updating the existing rule to require PARs for all PWRs with large dry containment buildings (Attachment 7). This action would be considered a backfit since no plants with large dry containments currently use PARs; therefore all licensees of such plants would be required to install PARs and maintain them for the duration of the plant licenses. To determine whether the backfitting of PARs is justified, the analysis assumes maximum benefit, i.e., that the PARs are 100 percent effective in preventing the early and late containment failures resulting from hydrogen combustion for both internal and external events. Thus, the analysis assumes that PARs would potentially eliminate containment failures from the combustion of gases produced during severe accidents.

Even with this assumption of the PARs effectiveness, this analysis indicates PARs backfits would not be cost-beneficial for the fleet of PWRs with large, dry containments. The Value-Impact is approximately -\$1,000,000/PWR or about -\$70,000,000 for the entire fleet of PWRs. The previous study on hydrogen control for PWRs with large, dry containments ("Hydrogen Combustion, Control, and Value-Impact Analysis for PWR Dry Containments," NUREG/CR-5662, BNL, June 1991) also concluded that a 100 percent effective hydrogen control system (hydrogen ignitor system), a system more effective than PARs, is not beneficial.

The staff concludes that applying PAR technology to the current fleet of PWRs with large, dry containments would provide little safety or risk benefit for a very large expenditure of resources. The staff believes that further consideration of uncertainties would not affect the conclusion. Unless directed otherwise, the staff will not pursue PAR backfits for large-dry containment designs.

ACRS and CRGR Reviews

The staff met with the Advisory Committee on Reactor Safeguards, on December 6, 2001, and the Committee to Review Generic Requirements, on December 18, 2001. Both committees commented favorably on the proposed rule and provided comments.

RESOURCES:

The resources to complete and implement the proposed rulemaking (\$40K and 1.25 FTE for FY 2002 and 0.5 FTE for FY 2003 for NRR and \$200K and 0.25 FTE for FY 2002 and 0.1 FTE for FY 2003 for RES) are included in the FY 2002 and FY 2003 budgets. The staff does not expect that additional resources will be needed to complete this effort.

COORDINATION:

The Office of the General Counsel has no legal objection to this paper. The Office of the Chief Financial Officer has reviewed this Commission paper for resource implications and has no objections. The CRGR has reviewed this proposed rule and will review the final rule.

RECOMMENDATIONS:

That the Commission:

1. *Approve* the notice of proposed rulemaking for publication (Attachment 1).
2. *Certify* that this rule, if promulgated, will not have a negative economic impact on a substantial number of small entities in order to satisfy requirements of the Regulatory Flexibility Act, 5 U.S.C. 605(b).3.

Note:

1. The following documents will be published in the *Federal Register* with a 75-day public comment period:
 - Notice of proposed rulemaking including the Environmental Assessment (Attachment 1)
 - Draft regulatory analysis (Attachment 2, also available in Public Document Room and on NRC rulemaking Web site)
 - Draft Regulatory Guide DG-1117, "Control of Combustible Gas Concentrations in Containment" (Attachment 3)
 - Draft revision to Standard Review Plan, Section 6.2.5, "Combustible Gas Control in Containment" (Attachment 4)
 - A model safety evaluation and proposed changes to the standard technical specifications to support the implementation of the proposed rule (Attachments 5 and 6)
2. The Chief Counsel for Advocacy of the Small Business Administration will be informed of the certification regarding economic impact on small entities and the basis for it, as required by the Regulatory Flexibility Act.
3. Copies of the *Federal Register* notice of proposed rulemaking will be distributed to all affected Commission licensees. The notice will be sent to other interested parties upon request.
4. A public announcement will be issued.
5. The appropriate Congressional committees will be informed.

/RA/

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Attachments:

1. Federal Register Notice
2. Regulatory Analysis
3. Draft Regulatory Guide (DG-1117)
4. Draft Standard Review Plan (Section 6.2.5)
5. Model Safety Evaluation
6. Draft Proposed Changes to Standard Technical Specifications
7. PAR: Value Impact Assessment

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ADAMS ACCESSION NO.: ML021080664

Commission Paper:ML021080576

Attachment 1:ML021080720

Attachment 2:ML021080807

Attachment 3:ML021080834

Attachment 4:ML021080850

Attachment 5:ML021090013

Attachment 6:ML020590489

Attachment 7:ML021090022

WITS NO.:WITS 20010003

***See previous concurrence**

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