

## **RULEMAKING ISSUE AFFIRMATION**

July 24, 2003

SECY-03-0127

FOR: The Commissioners

FROM: William D. Travers  
Executive Director for Operations

SUBJECT: FINAL RULEMAKING—RISK-INFORMED 10 CFR 50.44, “COMBUSTIBLE GAS CONTROL IN CONTAINMENT”

### PURPOSE:

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

### SUMMARY:

This final rule amends NRC’s regulations governing the domestic licensing of production and utilization facilities. Specifically, the rule eliminates the requirements for hydrogen recombiners and hydrogen purge systems in currently licensed light water reactors and relaxes the requirements for hydrogen and oxygen monitoring equipment commensurate with the equipment’s risk significance. The rule also specifies requirements for combustible gas control in future water-cooled reactors and non-water-cooled reactors.

### 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, risk-informed alternative. In a staff requirements

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301-415-1116

memorandum 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)". NRC action on this petition is completed as detailed in the attached *Federal Register* notice. A letter to the petitioner advising him of NRC's final action on his petition will be signed by the Secretary upon approval of the final rule. A copy of this letter is attached (Attachment 1).

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 in § 50.44 and § 50.46 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 that have already been approved by the NRC. NRC action on the portion of this petition pertaining to 10 CFR 50.44 is completed as detailed in the attached *Federal Register* notice. A letter to the petitioner advising that the NRC has partially completed action on the petition will be signed by the Secretary upon approval of the final rule. A copy of this letter is attached (Attachment 2). The remaining portion of the petition (relating to 10 CFR 50.46) will be closed out later by separate action.

On May 13, 2002, in SECY-02-0080, "Proposed Rulemaking - Risk-Informed 10 CFR 50.44 - Combustible Gas Control in Containment," the NRC staff provided the Commission with a proposed rulemaking package, including a cost-benefit analysis of installing passive autocatalytic recombiners (in response to a previous Commission request). In a staff requirements memorandum dated June 27, 2002, the Commission approved the issuance of the proposed rule. The NRC then published the rule in the *Federal Register* on August 2, 2002 (67 FR 50374). The public comment period expired on October 16, 2002. The NRC staff has evaluated the comments and has prepared the final rule.

#### DISCUSSION:

After 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 at nuclear power plants from the production and combustion of hydrogen (and other combustible gases) throughout 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)."

## Final Rule

The final rule retains existing requirements for ensuring a mixed atmosphere, inerting Mark I and Mark II containments, and providing hydrogen control systems capable of accommodating the amount of hydrogen generated from a metal-water reaction involving 75% of the fuel cladding surrounding the active fuel region in Mark III and ice condenser containments.<sup>1</sup> The rule also retains the existing analysis requirements and equipment survivability requirements for Mark III and ice condenser containments. It eliminates the design basis loss of coolant accident (LOCA) hydrogen release requirement from § 50.44, consolidates the requirements for hydrogen and oxygen monitoring into § 50.44, and relaxes safety classifications and licensee commitments to certain design and qualification criteria. The rule also condenses (without materially changing) the hydrogen control requirements in § 50.34(f) for future water-cooled reactor applicants and licensees and relocates these requirements to § 50.44. It also relocates the high-point vent requirements from § 50.44 to § 50.46a and eliminates a requirement that prohibits venting the reactor coolant system if it could “aggravate the challenge to containment.” The final rule also specifies requirements for combustible gas control in future reactors, including evaluation of combustible gases other than hydrogen. The regulatory text in the attached final rule differs from the language published in the proposed rule, reflecting the staff’s consideration and resolution of comments made by the Nuclear Energy Institute (NEI) regarding applicability of the rule to future reactor designs. This issue is discussed more fully in the next section. The final rule addresses Mr. Christie’s petition and addresses the § 50.44 portion of the NEI petition. The guidance reflects changes made by the final rule, including related changes that allow removal of hydrogen and oxygen monitors from the technical specifications. At plants with inerted containments (Mark I and Mark II BWRs), an existing technical specification for maintaining primary containment oxygen concentration below 4% by volume (i.e., inerted) will be retained.

## Public Comments on the Proposed Rule

The Commission received letters from 14 commenters, containing approximately 41 comments on the proposed rule and draft regulatory guide. Seven of the commenters were licensees, two were vendors, two were representatives of utility groups (many of whose members are licensees), two were private citizens, and one represented a citizen group. All comments on the rule and the information in and public comments on the two petitions for rulemaking were considered in formulating the final rule.

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<sup>1</sup>The Feasibility Study, in SECY-00-0198, indicated that some mitigative features may need to be enhanced beyond current requirements. This concern 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 has been evaluated and discussed with the Advisory Committee for Reactor Safeguards. The NRC is establishing requirements to provide backup power to allow the hydrogen igniters already installed in these facilities to function during station blackout events.

Many commenters expressed strong support for the rulemaking to risk-inform the regulations in § 50.44 and commended the NRC for developing a rule based on risk-informed and performance-based insights that will eliminate unnecessary regulatory requirements. One industry commenter stated that this rule will enhance public health and safety because it will increase the reliability of the hydrogen and oxygen monitoring systems. One private citizen questioned why the NRC was considering relaxing requirements that provide protection against some of the uncertainties and hazards of nuclear power. A citizen group opposed the changes, contending that eliminating the design basis accident release and relaxing safety classifications and licensee commitments to certain design and qualification criteria would only benefit the financial interests of licensees. Other comments suggested minor clarifications or editorial changes.

A comment submitted by the Nuclear Energy Institute (NEI) resulted in the most significant modification to language contained in the proposed rule. NEI commented that the proposed rule language in § 50.44(c) was applicable to all future reactors, yet it assumed that future reactors would present the same combustible gas hazard as current light water reactors. NEI recommended that § 50.44(c) be made applicable to light water reactors only. The NRC staff agrees with NEI that the requirements proposed in § 50.44(c) might not be appropriate for some future reactor designs. Thus, the final rule has been changed so that paragraph (c) applies only to water-cooled reactor designs with combustible gas characteristics similar to those of current light water reactors. The NRC has also added a new paragraph (d), that specifies general combustible gas control requirements for non-water-cooled reactors and certain water-cooled reactors with different combustible gas characteristics than current light water reactors. These facilities are required to be designed to tolerate or mitigate effects of any combustible gases generated by design basis or significant beyond-design-basis accidents. A detailed evaluation of all public comments is provided in Section IV of the attached *Federal Register* notice.

#### Contents of the Final Rulemaking Package

This rulemaking package includes the final rule to be published in the *Federal Register* (Attachment 3) and the final regulatory analysis (Attachment 4). The package also includes the final regulatory guide (Attachment 5) and the revision to the standard review plan (Attachment 6). Technical specification changes associated with the amended regulations will be implemented by the Consolidated Line Item Improvement Process. A model safety evaluation and the associated changes to the standard technical specifications will be published shortly after the final § 50.44 is published.

#### ACRS and CRGR Reviews

The staff's final rule was reviewed by the Advisory Committee on Reactor Safeguards (ACRS), on April 10, 2003, and by the Committee to Review Generic Requirements (CRGR) in May 2003. Both committees favored issuance of the final rule.

#### RESOURCES:

The FY 2003 resources to complete and implement the final rulemaking (0.5 FTE for NRR and 0.1 FTE for RES) are included in the FY 2003 budget. 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 ACRS and CRGR have reviewed this final rule.

RECOMMENDATIONS:

That the Commission:

1. *Approve* the notice of final rulemaking for publication (Attachment 3).
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.
- 3 *Note:*
  - a. The following documents will be published in the *Federal Register*.
    - The final rule, including the Finding of No Significant Environmental Impact (Attachment 3)
    - Notice of availability of the final regulatory analysis (Attachment 4, also available in Public Document Room and on the NRC rulemaking Web site)
    - Notice of availability of the final Regulatory Guide 1.7, Revision 3, "Control of Combustible Gas Concentrations in Containment" (Attachment 5)
    - Notice of availability of the revision to Standard Review Plan Section 6.2.5, "Combustible Gas Control in Containment" (Attachment 6)
  - b. 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.
  - c. The NRC has determined that this action is not a major rule under the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA) and has confirmed this determination with the Office of Management and Budget (OMB).
  - d. Copies of the final rule will be distributed to all affected Commission licensees. The notice will be sent to other interested parties upon request.
  - e. Letters informing the petitioners of the Commission's decisions on their petitions are attached for the Secretary's signature (Attachments 1 and 2).

- f. A public announcement will be issued.
- g. The appropriate congressional committees will be informed.

***/RA by Patricia Norry Acting For/***

William D. Travers  
Executive Director  
for Operations

Attachments:

1. Letter to Bob Christie
2. Letter to NEI
3. *Federal Register* notice with final rule
4. Regulatory Analysis
5. Regulatory Guide 1.7, Revision 3
6. Standard Review Plan Section 6.2.5

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**ADAMS ACCESSION NO. Package:**

<b>SECY Paper</b>	<b>ML031670912</b>
<b>Ltr to BChristie</b>	<b>ML031640408</b>
<b>Ltr to NEI</b>	<b>ML031640594</b>
<b>FRN:</b>	<b>ML031670903</b>
<b>Reg Analysis</b>	<b>ML031640441</b>
<b>Reg Guide</b>	<b>ML031640482</b>
<b>SRP</b>	<b>ML031640498</b>
	<b>ML031640518</b>

**\*See previous concurrence**

OFFICE	RPRP:PM	Tech Ed.	RPRP:SC	RPRP:(A)PD	RORP:PD	PMAS:D
NAME	RDudley*	PKleene*	SWest*	CIGrimes*	WBeckner*	MCase*
DATE	05/08/03	05/07/03	05/08/03	05/08/03	06/12 /03	05/09/03
OFFICE	FLO:D	DSSA:D	DIPM:D	DRIP:D	OCIO	ADM:D
NAME	JLyons*	SBlack*	BBoger/CAC <i>for/</i> *	DMatthews/FG <i>for/</i>	BMary*	MLesar*
DATE	05/12/03	05/16/03	06/11/03	05/08/03	05/19/03	05/19/03
OFFICE	OGC	ADIP	OCFO	RES:D	NRR:D	OEDO
NAME	STreby (NLO)	RWBorchardt	JFunches*	AThadani*/ <i>by</i> <i>memo/</i>	SCollins	WDTravers
DATE	06/20/03	06/27/03	05/13/03	05/29/03	06/27/03	07/24/03