[7590-01-P]

NUCLEAR REGULATORY COMMISSION

10 CFR Parts 50 and 52

RIN 3150 - AG76

Combustible Gas Control in Containment

AGENCY: U. S. Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The U. S. Nuclear Regulatory Commission (NRC) proposes to amend its regulations ~~10 CFR 50.44 by establishing risk-informed, performance-based requirements~~ for combustible gas control ~~systems~~ in power reactors applicable to current licensees, and ~~by~~ to set ~~setting~~ and consolidate ~~consolidating~~ combustible gas control regulations for future applicants and licensees. The proposed rule eliminates the requirements for hydrogen recombiners and hydrogen purge systems and relaxing the requirements for hydrogen and oxygen monitoring equipment to make them commensurate with their risk significance. This action stems from the Commission's ongoing effort to risk-inform its regulations, and is intended to reduce the regulatory burden on present and future power reactor licensees. ~~by eliminating the requirements for hydrogen recombiners and hydrogen purge systems and relaxing the requirements for hydrogen and oxygen monitoring equipment to make them commensurate with their risk significance.~~

In addition to the rulemaking and its associated analyses, the NRC is also proposing a draft regulatory guide, a draft standard review plan revision, and a Consolidated Line Item Improvement Process (CLIIP) for draft technical specifications changes to implement the proposed rule. The NRC is requesting comments on these documents as well as the proposed rulemaking.

DATES: Submit comments by (insert date 75 days after publication in the *Federal Register*). Comments received after this date will be considered if it is practical to do so, but the Commission is able to ensure consideration only for comments received on or before this date.

ADDRESSES: Submit comments to the Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Attention: Rulemakings and Adjudications Staff.

Deliver comments to: 11555 Rockville Pike, Rockville, Maryland, between 7:30 AM and 4:15 PM on Federal workdays.

You may also provide comments via the NRC's interactive rulemaking Website at http://ruleforum.llnl.gov. This site provides the capability to upload comments as files (any format) if your Web browser supports that function. For information about the interactive rulemaking Website, contact Ms. Carol Gallagher, (301) 415-5905 (e-mail: CAG@nrc.gov).

Certain documents related to this rulemaking, including comments received, may be examined at the NRC Public Document Room, 11555 Rockville Pike, Rockville, Maryland. Some of these documents may also be viewed and downloaded electronically via the rulemaking Website.

FOR FURTHER INFORMATION CONTACT: Anthony W. Markley, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone (301) 415-3165, e-mail awm@nrc.gov.

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I. Background

On October 27, 1978 (43 FR 50162), the Commission adopted a new rule, 10 CFR 50.44, specifying the standards for combustible gas control systems. The rule requires the applicant or licensee to show that during the time period following a postulated loss-of-coolant accident (LOCA), but prior to effective operation of the combustible gas control system, either: (1) an uncontrolled hydrogen-oxygen recombination would not take place in the

containment, or (2) the plant could withstand the consequences of an uncontrolled hydrogen-oxygen recombination without loss of safety function. If neither of these conditions could be shown, the rule required that the containment be provided with an inerted atmosphere to provide protection against hydrogen burning and explosion. The rule defined a release of hydrogen involving up to 5 percent oxidation of the fuel cladding as the amount of hydrogen to be assumed in determining compliance with the rule's provisions. This design-basis hydrogen release was based on the design-basis LOCA postulated by 10 CFR 50.46 and was multiplied by a factor of five for added conservatism to address possible further degradation of emergency core cooling.

The accident at Three Mile Island, Unit 2 involved oxidation of approximately 45 percent of the fuel cladding [NUREG/CR-6197, dated March 1994] with hydrogen generation well in excess of the amounts required to be considered for design purposes by § 50.44. In the aftermath of the Three Mile Island accident, the Commission reevaluated the adequacy of the regulations related to hydrogen control to provide greater protection in the event of accidents more severe than design-basis LOCAs. The Commission reassessed the vulnerability of various containment designs to hydrogen burning, which resulted in additional hydrogen control requirements adopted as amendments to § 50.44. The 1981 amendment, which added paragraphs (c)(3)(i), (c)(3)(ii), and (c)(3)(iii) to the rule, imposed the following requirements:
(1) an inerted atmosphere for boiling water reactor (BWR) Mark I and Mark II containments,
(2) installation of recombiners for light water reactors that rely on a purge or repressurization system as a primary means of controlling combustible gases following a LOCA, and
(3) installation of high point vents to relieve noncondensible gases from the reactor vessel (46 FR 58484, December 2, 1981).

On January 25, 1985 (50 FR 3498), the Commission published another amendment to

§ 50.44. This amendment, which added paragraph (c)(3)(iv), required a hydrogen control system justified by a suitable program of experiment and analysis for BWRs with Mark III containments and pressurized water reactors (PWRs) with ice condenser containments. In addition, plants with these containment designs must have systems and components to establish and maintain safe shutdown and containment integrity. These systems must be able to function in an environment after burning and detonation of hydrogen unless it is shown that these events are unlikely to occur. The control system must handle an amount of hydrogen equivalent to that generated from a metal-water reaction involving 75 percent of the fuel cladding surrounding the active fuel region.

When § 50.44 was amended in 1985, the NRC recognized that an improved understanding of the behavior of accidents involving severe core damage was needed. During the 1980s and 1990s, the Commission sponsored a severe accident research program to improve the understanding of core melt phenomena, combustible gas generation, transport and combustion, and to develop improved models to predict the progression of severe accidents. The results of this research have been incorporated into various studies (e.g., NUREG-1150 and probabilistic risk assessments performed as part of the Individual Plant Examination (IPE) program) to quantify the risk posed by severe accidents for light water reactors.

The result of these studies has been an improved understanding of combustible gas behavior during severe accidents and confirmation that the hydrogen release postulated from a design-basis LOCA was not risk-significant because it would not lead to containment failure, and that the risk associated with hydrogen combustion was from beyond design-basis (e.g., severe accidents) accidents. These studies also confirmed the assessment of vulnerabilities that went into the 1981 and 1985 amendments which required additional hydrogen control measures for some containment designs.

II. Rulemaking Initiation

In a June 8, 1999, Staff Requirements Memorandum (SRM) on SECY-98-300, Options for Risk-informed Revisions to 10 CFR Part 50 - "Domestic Licensing of Production and Utilization Facilities," the Commission approved proceeding with a study of risk-informing the technical requirements of 10 CFR Part 50. The NRC staff provided its plan and schedule for the study phase of its work to risk-inform the technical requirements of 10 CFR Part 50, in SECY-99-264, "Proposed Staff Plan for Risk-Informing Technical Requirements in 10 CFR Part 50" dated November 8, 1999. The Commission approved proceeding with the plan for risk-informing the Part 50 technical requirements in a February 3, 2000, SRM. Section 50.44 was selected as a test case for piloting the process of risk-informing 10 CFR Part 50 in SECY-00-0086, "Status Report on Risk-Informing the Technical Requirements of 10 CFR Part 50 (Option 3)."

Mr. Christie of Performance Technology, Inc. submitted letters, dated October 7 and November 9, 1999, that requested changes to the regulations in § 50.44. He requested that the regulations be amended to: reflect that the hydrogen source term be based on realistic calculations for accidents with a high probability of causing severe reactor core damage; eliminate the requirement to monitor hydrogen concentration; eliminate the requirement to control combustible gas concentration resulting from a postulated-LOCA; retain the requirement to inert Mark I and II containments; retain the requirement for high point vents; require licensees with Mark III and ice condenser containments to have hydrogen control systems capable of meeting a specified performance level; and specify that facilities with other types of containments "must demonstrate that the reactor containment (based on realistic calculations) can withstand, without any hydrogen control system, a hydrogen burn for accidents with a high probability of causing severe core damage."

These letters have been treated by the NRC as a petition for rulemaking and assigned the Docket No. PRM-50-68. The NRC published a document requesting comment on the petition in the Federal Register on January 12, 2000 (65 FR 1829). The issues associated with § 50.44 raised by the petitioner were discussed 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). The proposed rule and the petition are consistent in most areas, with the following exceptions proposed by the NRC: a functional requirement for hydrogen monitoring, the capability for ensuring a mixed atmosphere, and the expectation that future plants preclude concentrations of hydrogen below limits that may support detonation. The Commission's basis for including these requirements in the proposed rule is addressed in the subsequent sections of this supplementary information.

The Commission also received a petition for rulemaking filed by the Nuclear Energy Institute. The petition was docketed on April 12, 2000, and has been assigned Docket No. PRM-50-71. The petitioner requests 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 received approval by the NRC staff. The petitioner believes the proposed amendment would improve the efficiency of the regulatory process by eliminating the need for individual licensees to obtain exemptions to use advanced cladding materials which have already been approved by the NRC. The proposed rule would remove the restrictive language in 10 CFR 50.44 that precludes the use of zirconium-based cladding materials other than zircaloy or ZIRLO. The change requested by the petitioner is unrelated to the risk-informing of 10 CFR 50.44. The Commission is addressing this petition in this rulemaking for effective use

of resources. The NRC published a document requesting comment on the petition in the Federal Register on May 30, 2000 (65 FR 34599).

In SECY-00-0198, dated September 14, 2000, the NRC staff proposed a risk-informed voluntary alternative to the current § 50.44. Attachment 2 to that paper, hereafter referred to as the Feasibility Study, used the framework described in Attachment 1 to the paper and risk insights from NUREG-1150 and the IPE programs, to evaluate the requirements in § 50.44. The Feasibility Study found that combustible gas generated from design-basis accidents was not risk-significant for any containment type, given intrinsic design capabilities or installed mitigative features. The Feasibility Study also concluded that combustible gas generated from severe accidents was not risk significant for (1) Mark I and II containments provided that the required inerted atmosphere was maintained, (2) Mark III and ice condenser containments provided that the required igniter systems were maintained and operational, and (3) large, dry and sub-atmospheric containments because the large volumes, high failure pressures, and likelihood of random ignition help prevent the build-up of hydrogen concentrations.

The Feasibility Study did conclude that the existing requirements for combustible gas mitigative features were risk-significant and must be retained. Additionally, the Feasibility Study also indicated that some mitigative features may need to be enhanced beyond current requirements. This 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 will proceed independently of this rulemaking.

The staff incorporated Mr. Christie's petition into the effort to risk-inform § 50.44. A comparison of Mr. Christie's petition for rulemaking to the staff's recommended alternative was provided in Attachment 3 to SECY-00-0198. In an SRM dated January 19, 2001, the

Commission directed the NRC staff to proceed expeditiously with rulemaking on the risk-informed alternative to § 50.44.

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 NRC staff recommended a revised approach to the rulemaking effort. This revised approach recognized that risk-informing Part 50, Option 3 was based on a realistic reevaluation of the basis of a regulation and the application of realistic risk analyses to determine the need for and relative value of regulations that address a design-basis issue. The result of this process necessitates a fundamental reevaluation or "rebaselining" of the existing regulation, rather than the development of a voluntary alternative approach to rulemaking. Lastly, upon its own initiative, the staff incorporated the relevant portions of the NEI petition into this rulemaking. On November 14, 2001, in response to Commission direction in an SRM dated August 2, 2001, the staff published draft rule language on the NRC web site for stakeholder review and comment. In an SRM dated December 31, 2001, the Commission directed the staff to proceed with the revision to the existing § 50.44 regulations.

III. Proposed Action

The Commission proposes to retain 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 containments. The Commission proposes to eliminate the design-basis LOCA hydrogen release from § 50.44 and to consolidate the requirements for hydrogen and oxygen monitoring into § 50.44 while relaxing safety classifications and licensee commitments to certain design and qualification criteria. The Commission also proposes to relocate without change the

hydrogen control requirements in § 50.34(f) to § 50.44. The Commission proposes to relocate 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 to containment. The NRC received comments on the draft rule language published on the web site from seven members of the public which included both petitioners, four utilities, and a law firm that represents the Nuclear Utility Group on Equipment Qualification. The comments were overwhelmingly supportive of the draft proposed rule language. The Commission used stakeholder comments on the draft rule language, information provided in licensee exemption submittals, in the petitions for rulemaking, and in the Boiling Water Reactor Owners Group (BWROG) topical report to inform its deliberations and decisions with respect to specific rule language and positions taken.

The Commission also received feedback on several issues for which comments were specifically requested in the draft rule language. The existing rule provides detailed, prescriptive instructions using American Society of Mechanical Engineers (ASME) references for the performance of boiling water reactor (BWR) Mark III and pressurized water reactor (PWR) ice condenser containments. The staff provided an option for a more performance-based approach for stakeholder consideration, which received positive public comment. Based upon stakeholder input, the proposed rule eliminates the existing references to ASME and prescriptive requirements and the proposed regulatory guide, attached to this paper, includes the ASME approach as one in which the intent of the regulations could be satisfied which simplifies the proposed regulations.

The staff also requested feedback on the utility of post-accident inerting as a means of combustible gas control. To date, no current licensee facility has exercised this alternative to address the control of combustible gas nor has any new reactor design opted for this approach.

The major concerns involved with post-accident inerting of containment are expense and the 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 stakeholder input, the proposed rule eliminates the post-accident inerting option which also simplifies the proposed regulations.

Substantive changes in rule language that resulted from consideration of public comments are addressed in the following subject sections.

A. Retention of Inerting, BWR Mark III and PWR Ice Condenser Hydrogen Control Systems, Mixed Atmosphere Requirements, And Associated Analysis Requirements

The Commission proposes to retain the existing requirement in § 50.44(c)(3)(i) to inert Mark I and II type containments. Given the relatively small volume and large zirconium inventory, these containments, without inerting, would have a high likelihood of failure from hydrogen combustion due to the potentially large concentration of hydrogen that a severe accident could cause. Retaining the requirement maintains the current level of public protection, as discussed in Section 4.3.2 of the Feasibility Study.

The Commission proposes to retain the existing requirements in § 50.44(c)(3)(iv), (v), and (vi) that BWRs with Mark III containments and PWRs with ice condenser containments provide a hydrogen control system justified by a suitable program of experiment and analysis. The amount of hydrogen to be considered is that generated from a metal-water reaction involving 75 percent of the fuel cladding surrounding the active fuel region (excluding the cladding surrounding the plenum volume). The analyses must demonstrate that the structures, systems and component necessary for safe shutdown and maintaining containment integrity must perform their functions during and after exposure to the conditions created by the burning

hydrogen. Environmental conditions caused by local detonations of hydrogen must also be included, unless such detonations can be shown unlikely to occur. A beyond design-basis accident generating significant amounts of hydrogen (on the order of Three Mile Island, Unit 2, accident or a metal water reaction involving 75% of fuel cladding surrounding the active fuel region) would pose a severe threat to the integrity of these containment types in the absence of the installed igniter systems. Section 4.3.3 of the Feasibility Study concluded that hydrogen combustion is not risk-significant, in terms of the framework document's quantitative guidelines, when igniter systems installed to meet § 50.44(c)(3)(iv), (v), and (vi) are available and operable. The Commission proposes to retain these requirements. Previously reviewed and approved licensee analyses to meet the existing regulations constitute compliance with this proposed section. The results of these analyses must continue to be documented in the plant's Updated Final Safety Analysis Report in accordance with § 50.71(e).

The Commission proposes to retain the § 50.44(b)(2) requirement that all containments ensure a mixed atmosphere. A mixed containment atmosphere prevents local accumulation of combustible or detonable gases which could threaten containment integrity or equipment operating in a local compartment. The current regulation ensures that features that promote atmospheric mixing, either active systems and/or containment internal structures that have design features which promote the free circulation of the containment atmosphere, are provided.

B. Elimination of Design-Basis LOCA Hydrogen Release

The proposed rule would remove the existing definition of a design-basis LOCA hydrogen release and eliminate requirements for hydrogen control systems to mitigate such a release. The installation of recombiners and/or vent and purge systems required by

§ 50.44(b)(3) was intended to address the limited quantity and rate of hydrogen generation that was postulated from a design-basis LOCA. The Commission finds that this hydrogen release is not risk-significant. This finding is based on the Feasibility Study which found that the design-basis LOCA hydrogen release did not contribute to the conditional probability of a large release up to approximately 24 hours after the onset of core damage. The requirements for combustible gas control that were developed after the Three Mile Island Unit 2 accident were intended to minimize potential additional challenges to containment due to long term residual or radiolytically generated hydrogen. The Commission found that containment loadings associated with long term hydrogen concentrations are no worse than those considered in the first 24 hours and are, therefore, not risk-significant. The Commission believes that accumulation of combustible gases beyond 24 hours can be managed by licensee implementation of the severe accident management guidelines (SAMGs) or other ad hoc actions because of the long period of time available to take such action. Therefore, the Commission proposes to eliminate the hydrogen release associated with a design-basis LOCA from § 50.44 and the associated requirements that necessitated the need for the hydrogen recombiners and the backup hydrogen vent and purge systems.

In plants with Mark I and II containments, the containment atmosphere is required to be maintained with a low concentration of oxygen, rendering it inert to combustion. Mark I and II containments can be challenged beyond 24 hours by the long-term generation of oxygen through radiolysis. The regulatory analysis for this proposed rulemaking found the cost of maintaining the recombiners exceeded the benefit of retaining them to prevent containment failure sequences that progress to the very late time frame. The Commission believes that this conclusion would also be true for the backup hydrogen purge system even though the cost of

the hydrogen purge system would be much lower because the system is also needed to inert the containment.

The Commission continues to view severe accident management guidelines as an important part of the severe accident closure process. Severe accident management guidelines are part of a voluntary industry initiative to address accidents beyond the design basis and emergency operating instructions. In November 1994, the US nuclear industry committed to implement severe accident management at their plants by December 31, 1998, using the guidance contained in NEI 91-04, Revision 1, “Severe Accident Issue Closure Guidelines.” Generic severe accident management guidelines developed by each nuclear steam system supplier owners group includes either purging and venting or venting the containment to address combustible gas control. On the basis of the industry-wide commitment, the Commission is not proposing to require such capabilities, but continues to view purging and/or controlled venting of all containment types to be an important combustible gas control strategy that should be considered in a plant’s severe accident management guidelines.

C. Oxygen Monitoring Requirements

The Commission proposes to amend § 50.44 to codify the existing regulatory practice of monitoring oxygen in containments that use an inerted atmosphere for combustible gas control. Standard technical specifications and licensee technical specifications currently require oxygen monitoring to verify the inerted condition in containment. Combustible gases produced by beyond design-basis accidents involving both fuel-cladding oxidation and core-concrete interaction would be risk-significant for plants with Mark I and II containments if not for the inerted containment atmosphere. If an inerted containment was to become de-inerted during a beyond design-basis accident, then other severe accident management strategies, such as

purging and venting, would need to be considered. The oxygen monitoring is needed to implement these severe accident management strategies, in plant emergency operating procedures and is also used as an input in emergency response decision making.

The Commission proposes reclassifying oxygen monitors as not safety-related components. Currently, as recommended by the Commission's Regulatory Guide (RG) 1.97, oxygen monitors are classified as Category 1. Category 1 is defined as applying to instrumentation designed for monitoring variables that most directly indicate the accomplishment of a safety function for design-basis events. By eliminating the design-basis LOCA hydrogen release, the oxygen monitors are no longer required to mitigate design-basis accidents. The Commission finds that Category 2, defined in RG 1.97, as applying to instrumentation designated for indicating system operating status, to be the more appropriate categorization for the oxygen monitors, because the monitors will still continue to be required to verify the status of the inerted containment. Further, the staff concludes that sufficient reliability of oxygen monitoring, commensurate with its risk-significance, will be achieved by the guidance associated with the Category 2 classification. Because of the various regulatory means, such as orders, that were used to implement post-TMI requirements, this proposed relaxation may require a license amendment. Licensees would also need to update their final safety analysis report to reflect the new classification and RG 1.97 categorization of the monitors in accordance with 10 CFR 50.71(e).

D. Hydrogen Monitoring Requirements

The Commission proposes to maintain the existing requirement in § 50.44(b)(1) for monitoring hydrogen in the containment atmosphere for all plant designs. Section 50.44(b)(1), standard technical specifications and licensee technical specifications currently contain requirements for monitoring hydrogen, including operability and surveillance requirements for

the monitoring systems. Licensees have also made commitments to design and qualification criteria for hydrogen monitors in NUREG-0737, Item II.F.1, Attachment 6 and in RG 1.97. The hydrogen monitors are required to assess the degree of core damage during a beyond design-basis accident and confirm that random or deliberate ignition has taken place. Hydrogen monitors are also used, in conjunction with oxygen monitors in inerted containments, to guide response to emergency operating procedures. Hydrogen monitors are also used in emergency operating procedures of BWR Mark III facilities. If an explosive mixture that could threaten containment integrity exists, then other severe accident management strategies, such as purging and/or venting, would need to be considered. The hydrogen monitors are needed to implement these severe accident management strategies.

The Commission proposes to reclassify the hydrogen monitors as not safety-related components. With the proposed elimination of the design-basis LOCA hydrogen release (see Item B. earlier), the hydrogen monitors are no longer required to mitigate design-basis accidents and, therefore, the hydrogen monitors do not meet the definition of a safety-related component as defined in § 50.2. This is consistent with the Commission's proposal that oxygen monitors that are used for beyond-design basis accidents need not be safety grade.

Currently, RG 1.97 recommends classifying the hydrogen monitors in Category 1, defined as applying to instrumentation designed for monitoring key variables that most directly indicate the accomplishment of a safety function for design-basis accident events. The hydrogen monitors no longer meet the definition of Category 1 in RG 1.97 and, therefore, the Commission believes that licensees' current commitments are unnecessarily burdensome. The Commission believes that Category 3, as defined in RG 1.97, is an appropriate categorization for the hydrogen monitors because the monitors are required to diagnose the course of beyond design-basis accidents. Category 3 applies to high-quality, off-the-shelf backup and diagnostic

instrumentation. As with the revision to oxygen monitoring, this proposed relaxation may require a license amendment. Licensees would also need to update their final safety analysis report to reflect the new classification and RG 1.97 categorization of the monitors in accordance with 10 CFR 50.71(e).

E. Combustible Gas Control Requirements for Future Applicants

The Commission proposes to set forth combustible gas control requirements for all future applicants for or holders of a construction permit or an operating license under Part 50, and to all future applicants for design approval, design certification, or a combined license under Part 52. These requirements would consolidate combustible gas requirements for existing and future light water reactors in § 50.44. Section 52.47(a)(ii) requires demonstration of compliance with the technically relevant portions of the Three Mile Island requirements in § 50.34(f). Section 50.34(f)(2)(ix) requires a system for hydrogen control that can safely accommodate hydrogen generated by the equivalent of a 100 percent fuel-clad metal-water reaction. In addition, the regulation requires this system to be capable of precluding uniform concentrations of hydrogen from exceeding 10 percent (by volume), or providing an inerted atmosphere within the containment. The Commission is proposing requirements for future light water reactors that are consistent with the criteria currently contained in § 50.34(f)(2)(ix) to preclude local concentrations of hydrogen collecting in areas where unintended combustion or detonation could cause loss of containment integrity or loss of appropriate mitigating features. These requirements are in keeping with the Commission's expectation that future designs will achieve a higher standard of severe accident performance (50 FR 32138; August 8, 1985). Additional advantages of providing hydrogen control mitigation features (rather than reliance on random ignition of richer mixtures) include the lessening of pressure and temperature loadings on the containment and essential equipment.

F. Clarification and Relocation of High Point Vent Requirements From 10 CFR 50.44 to 10 CFR 50.46a

The Commission proposes to remove the current requirements for high point vents from § 50.44 and to transfer them to a new § 50.46a. The Commission proposes relocating these requirements because high point vents are relevant to emergency core cooling system (ECCS) performance during severe accidents, and § 50.44 does not address ECCS performance. The requirement to install high point vents was imposed by the 1981 amendment to § 50.44. This requirement permitted venting of noncondensible gases which may interfere with the natural circulation pattern in the reactor coolant system. This process is regarded as an important safety feature in accident sequences that credit natural circulation of the reactor coolant system. In other sequences, the pockets of noncondensible gases may interfere with pump operation. The high point vents could be instrumental for terminating a core damage accident if ECCS operation is restored. Under these circumstances, venting noncondensible gases from the vessel allows emergency core cooling flow to reach the damaged reactor core and thus prevents further accident progression.

The Commission proposes to amend the language in current § 50.44(c)(3)(iii) by deleting the statement, “the use of these vents during and following an accident must not aggravate the challenge to the containment or the course of the accident.” For certain severe accident sequences, the use of reactor coolant system high point vents is intended to reduce the amount of core damage by providing an opportunity to restore reactor core cooling. While the release of noncondensible and combustible gases from the reactor coolant system will, in the short term, “aggravate” the challenge to containment, the use of these vents will positively affect the overall course of the accident. The release of any combustible gases from the reactor coolant system has been considered in the containment design and mitigative features

that are required for combustible gas control. Any venting is highly unlikely to affect containment integrity; however, such venting will reduce the likelihood of further core damage. Inasmuch as the overall safety is increased by venting through high point vents, the Commission proposes elimination of this statement in § 50.46a.

G. Elimination of Post-Accident Inerting

The proposed rule would no longer provide an option to use post-accident inerting as a means of combustible gas control. Although post-accident inerting systems were permitted as a possible alternative for mitigating combustible gas concerns after the accident at Three Mile Island, Unit 2, these systems have never been implemented to date. Concerns with a post-accident inerting system include: corrosion (if halon gas is used as the inerting agent), increase in containment pressure with use, limitations on emergency response personnel access, and cost. Sections 50.44(c)(3)(iv)(D) and 50.34(f)(ix)(D) were promulgated to address these concerns. On November 14, 2001, draft rule language was made available to elicit comment from interested stakeholders. The draft rule language recommended eliminating the option to use post-accident inerting as a means of combustible gas control and asked stakeholders if there was a need to retain these requirements. Stakeholder feedback supported the staff recommendation to eliminate the post-accident inerting option and indicated that licensees do not intend to convert existing plants to use post-accident inerting. Because there is no need for the regulations to support an approach that is unlikely to be used, post-accident inerting requirements are being eliminated.

IV. Section-by-Section Analysis of Substantive Changes

Section 50.44 - Combustible gas control in containment.

Paragraph (a) [*Definitions*]. Paragraph (a) adds definitions for two previously undefined terms, “mixed atmosphere,” and “inerted atmosphere.”

Paragraph (b) [*Requirements for currently-licensed reactors*]. This paragraph would set forth the requirements for control of combustible gas in containment for currently-licensed reactors. All BWRs with Mark I and II type containments will be required to have an inerted containment atmosphere, and all BWR Mark III type containments and PWR s with ice condenser type containments would be required to include a capability for controlling combustible gas generated from a metal water reaction involving 75% of the fuel cladding surrounding the active fuel region (excluding the cladding surrounding the plenum volume) so that there is no loss of containment integrity. Current requirements in § 50.44(c)(i), (iv), (v), and (vi) would be incorporated in to the proposed amended regulation without substantial change. Previously reviewed and installed combustible gas control mitigation features to meet the existing regulations are considered in compliance with this proposed section. Because these proposed requirements address beyond design-basis combustible gas control, it is acceptable for structures, systems, and components provided to meet these requirements to not be safety-related and may be procured as commercial grade items.

Proposed paragraph (b)(1) [*Mixed atmosphere*]. The requirement for capability ensuring a mixed atmosphere in all containments is consistent with the current requirement in § 50.44(b)(2) and would not require further analysis or modifications by current licensees. The intent of this requirement is to maintain those plant design features (e.g., availability of active mixing systems or open compartments) that promote atmospheric mixing. The requirement could be met with active or passive systems. Active systems could include a fan, a fan cooler or containment spray. Passive capability could be demonstrated by evaluating the containment for susceptibility to local hydrogen concentration. These evaluations have been conducted for currently licensed reactors as part of the IPE program.

Proposed paragraph (b)(3) retains the existing requirements for BWR Mark III and PWR ice condenser facilities that do not use inerting to establish and maintain safe shutdown and containment structural integrity to use structures, systems, and components capable of performing their functions during and after exposure to hydrogen combustion.

Proposed paragraph (b)(4)(i) would codify the existing regulatory practice of monitoring oxygen in containments that use an inerted atmosphere for combustible gas control. The proposed rule would not require further analysis or modifications by current licensees but certain design and qualification criteria would be relaxed. The proposed rule requires that equipment for monitoring oxygen be functional, reliable and capable of continuously measuring the concentration of oxygen in the containment atmosphere following a beyond design-basis accident. Equipment for monitoring oxygen is expected to perform in the environment anticipated in the severe accident management guidance. The oxygen monitors are expected to be of high-quality and may be procured as commercial grade items. Existing oxygen monitoring commitments for currently licensed plants are sufficient to meet the intent of this rule.

Proposed paragraph (b)(4)(ii) would retain the requirement in § 50.44(b)(1) for measuring the hydrogen concentration in the containment. The proposed rule would not require further analysis or modifications by current licensees but certain design and qualification criteria would be relaxed. The proposed rule requires that equipment for monitoring hydrogen be functional, reliable and capable of continuously measuring the concentration of hydrogen in the containment atmosphere following a beyond design-basis accident. Equipment for monitoring hydrogen is expected to perform in the environment anticipated in the severe accident management guidance. The hydrogen monitors may be procured as commercial

grade items. Existing hydrogen monitoring commitments for currently licensed plants are sufficient to meet the intent of this rule.

Paragraph (c) [*Requirements for future applicants and licensees*]. Proposed paragraph (c) would promulgate requirements for combustible gas in containment control for all future construction permits or operating licenses under Part 50 and to all design approvals, design certifications, combined licenses or manufacturing licenses under Part 52. The current requirements in § 50.34(f)(2)(ix) and (f)(3)(v) would be retained. Proposed paragraph (c)(2) would require all containments to have an inerted atmosphere or limit hydrogen concentrations in containment during and following an accident that releases an equivalent amount of hydrogen as would be generated from a 100 percent fuel-clad coolant reaction, uniformly distributed, to less than 10 percent and maintain containment structural integrityand appropriate mitigating features. Structures, systems, and components (SSCs) provided to meet this requirement must be designed to provide reasonable assurance that they will operate in the severe accident environment for which they are intended and over the time span for which they are needed. Equipment survivability expectations under severe accident conditions should consider the circumstances of applicable initiating events (such as station blackout[1] or earthquakes) and the environment (including pressure, temperature, and radiation) in which the equipment is relied upon to function. The required system performance criteria will be based on the results of design-specific reviews which include probabilistic risk-assessment as required by 10 CFR 52.47(a)(v). Because these requirements address beyond design-basis

[1]The Proposed Section 50.44 does not require the deliberate ignition systems used by BWRs with Mark III type containments and PWRs with ice condenser type containments to be available during station blackout events. The deliberate ignition systems should be available upon restoration of power. Additional guidance concerning the availability of deliberate ignition systems during station blackout sequences is being developed as part of the staff's review of Generic Safety Issue 189: "Susceptibility of Ice Condenser and Mark III Containments to Early Failure from Hydrogen Combustion During a Severe Accident."

combustible gas control, SSCs provided to meet these requirements need not be subject to the environmental qualification requirements of 10 CFR Section 50.49; quality assurance requirements of 10 CFR Part 50, Appendix B; and redundancy/diversity requirements of 10 CFR Part 50, Appendix A. Guidance such as that found in Appendices A and B of RG 1.155, "Station Blackout," is appropriate for equipment used to mitigate the consequences of severe accidents. Proposed paragraph (c) would also promulgate requirements for ensuring a mixed atmosphere and monitoring oxygen and hydrogen in containment, consistent with the requirements for current plants set forth in proposed paragraphs (b)(1), and (b)(4)(i) and (ii).

Section 50.46a - Acceptance criteria for reactor coolant system venting systems.

Proposed § 50.46a would be a new section which relocates the requirements for high point vents currently contained in § 50.44. The amendment includes a change that eliminates a requirement prohibiting venting the reactor coolant system if it could “aggravate” the challenge to containment. Any venting is highly unlikely to affect containment integrity; however, such venting will reduce the likelihood of further core damage. Commission continues to view use of the high point vents to be an important strategy that should be considered in a plant’s severe accident management guidelines.

Section 52.47 - Contents of applications.

§ 52.47 would be amended to eliminate the reference to subsections within § 50.34(f) for technically relevant requirements for combustible gas control in containment for future design approval, design certification, or license applicants. These applicants would reference § 50.44 for technical requirements for combustible gas control in containment.

V. Plain Language

The Presidential memorandum dated June 1, 1998, entitled “Plain Language in Government Writing” directed that the Government’s writing be in plain language. This

memorandum was published on June 10, 1998 (63 FR 31883). In complying with this directive, editorial changes have been made in these proposed revisions to improve the organization and readability of the existing language of the paragraphs being revised. These types of changes are not discussed further in this document. The NRC requests comments on the proposed rule specifically with respect to the clarity and reflectiveness of the language used. Comments should be sent to the address listed under the ADDRESSES caption of the preamble.

VI. Voluntary Consensus Standards

The National Technology Transfer and Advancement Act of 1995, Pub. L. 104-113, requires that Federal agencies use technical standards that are developed or adopted by voluntary consensus standards bodies unless using such a standard is inconsistent with applicable law or is otherwise impractical. In this proposed rule, the NRC proposes to use the following Government-unique standard: 10 CFR 50.44, U.S. Nuclear Regulatory Commission, October 27, 1978 (43 FR 50163), as amended. The NRC is not aware of any voluntary consensus standard that could be used instead of the proposed Government-unique standard. The NRC will consider a voluntary consensus standard if an appropriate standard is identified. If a voluntary standard is identified for consideration, the submittal should explain how the voluntary consensus standard is comparable and why it should be used instead of the proposed Government-unique standard.

VII. Finding of No Significant Environmental Impact: Environmental Assessment

The Commission has determined under the National Environmental Policy Act of 1969, as amended, and the Commission's regulations in Subpart A of 10 CFR Part 51, that this rule, if adopted, would not be a major Federal action significantly affecting the quality of the human environment and, therefore, an environmental impact statement is not required. The basis for this determination reads as follows:

This action endorses existing requirements and establishes regulations that reduce regulatory burdens for current and future licensees and consolidates combustible gas control regulations for future applicants and licensees. This action stems from the Commission's ongoing effort to risk-inform its regulations. The proposed rule would reduce the regulatory burdens on present and future power reactor licensees by eliminating the LOCA design-basis accident as a combustible gas control concern. This change eliminates the requirements for hydrogen recombiners and hydrogen purge systems and relaxes the requirements for hydrogen and oxygen monitoring equipment to make them commensurate with their safety and risk significance.

The proposed action would not significantly increase the probability or consequences of an accident. No changes are being made in the types or quantities of radiological effluents that may be released off site, and there is no significant increase in public radiation exposure since there is no change to facility operations that could create a new or affect a previously analyzed accident or release path. There may be a reduction of occupational radiation exposure since personnel will no longer be required to maintain or operate, if necessary, the hydrogen recombiner systems which are located in or near radiologically controlled areas.

With regard to non-radiological impacts, no changes are being made to non-radiological plant effluents and there are no changes in activities that would adversely affect the environment. Therefore, there are no significant non-radiological impacts associated with the proposed action.

The primary alternative to this action would be the no action alternative. The no action alternative would continue to impose unwarranted regulatory burdens for which there would be little or no safety, risk, or environmental benefit.

The determination of this environmental assessment is that there will be no significant offsite impact to the public from this action. However, the general public should note that the NRC is seeking public participation. Comments on any aspect of the environmental assessment may be submitted to the NRC as indicated under the ADDRESSES heading.

The NRC has sent a copy of this proposed rule to every State Liaison Officer and requested their comments on the environmental assessment.

VIII. Paperwork Reduction Act Statement

This proposed rule decreases the burden on new applicants to complete the hydrogen control analysis required to be submitted in a license application, as required by sections 50.34 or 52.47. The public burden reduction for this information collection is estimated to average 720 hours per request. Because the burden for this information collection is insignificant, Office of Management and Budget (OMB) clearance is not required. Existing requirements were approved by the Office of Management and Budget, approval numbers 3150-0011 and 3150-0151.

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

IX. Regulatory Analysis

The Commission has prepared a draft regulatory analysis on this proposed regulation. The analysis examines the costs and benefits of Commission alternatives for updating the existing rule to accommodate technological advances while addressing regulatory relaxation issues. From an overall safety and value impact perspective, the analysis recommends

removing hydrogen recombiner requirements and relaxing hydrogen and oxygen monitoring requirements.

The Commission requests public comment on the draft regulatory analysis. The regulatory analysis may be viewed and downloaded, and comments may be submitted at the NRC Rulemaking Web site. Single copies of the analysis are also available from Anthony Markley, Office of Nuclear Reactor Regulation, (301) 415-3165, e-mail awm@nrc.gov. Comments on the draft analysis may be submitted to the NRC as indicated under the ADDRESSES heading.

X. Regulatory Flexibility Certification

As required by the Regulatory Flexibility Act, as amended, 5 U.S.C. 605(b), the Commission certifies that this proposed rule, if adopted, would not have a significant economic impact on a substantial number of small entities. This proposed rule would affect only licensees authorized to operate nuclear power reactors. These licensees do not fall within the scope of the definition of "small entities" set forth in the Regulatory Flexibility Act, or the Size Standards established by the Nuclear Regulatory Commission (10 CFR 2.810).

XI. Backfit Analysis

The NRC has determined that the backfit rule does not apply to this proposed rule; therefore, a backfit analysis is not required for this proposed rule because these amendments do not impose more stringent safety requirements on 10 CFR Part 50 licensees. For current licensees, the proposed amendments either maintain without substantive change existing requirements or reduce current regulatory requirements. For future applicants and future licensees, the proposed requirements do not involve backfitting as defined in 10 CFR 50.109(a)(1). This is because any changes will have only a prospective effect on future design certification applicants and future applicants for licensees under 10 CFR Part 50 and 52.

As the Commission has indicated in other rulemakings, sec., e.g., 54 FR 15372, April 18, 1989 (Final Part 52 Rule), the expectations of future applicants are not protected by the Backfit Rule. Therefore, the NRC has not prepared a backfit analysis for this rulemaking.

List of Subjects

10 CFR Part 50

Antitrust, Classified information, Criminal penalties, Fire protection, Intergovernmental relations, Nuclear power plants and reactors, Radiation protection, Reactor siting criteria, Reporting and record keeping requirements.

10 CFR Part 52

Administrative practice and procedure, Antitrust, Backfitting, Combined license, Early site permit, Emergency planning, Fees, Inspection, Limited work authorization, Nuclear power plants and reactors, Probabilistic risk assessment, Prototype, Reactor siting criteria, Redress of site, Reporting and record keeping requirements, Standard design, Standard design certification.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974, as amended; and 5 U.S.C. 553, the NRC is proposing to adopt the following amendments to 10 CFR Parts 50 and 52.

PART 50 -- DOMESTIC LICENSING OF PRODUCTION AND UTILIZATION FACILITIES

1. The authority citation for Part 50 continues to read as follows:

AUTHORITY: Secs. 102, 103, 104, 105, 161, 182, 183, 186, 189, 68 Stat. 936, 938, 948, 953, 954, 955, 956, as amended, sec. 234, 83 Stat. 444, as amended (42 U.S.C. 2132, 2133, 2134, 2135, 2201, 2232, 2233, 2239, 2282); secs. 201, as amended, 202, 206, 88 Stat. 1242, as amended, 1244, 1246 (42 U.S.C. 5841, 5842, 5846).

Section 50.7 also issued under Pub. L. 95-601, sec. 10, 92 Stat. 2951, as amended by Pub. L. 102-486, sec. 2902, 106 Stat. 3123 (42 U.S.C. 5851). Section 50.10 also issued under secs. 101, 185, 68 Stat. 936, 955, as amended (42 U.S.C. 2131, 2235); sec. 102, Pub. L. 91-190, 83 Stat. 853 (42 U.S.C. 4332). Sections 50.13, 50.54(dd), and 50.103 also issued under sec. 108, 68 Stat. 939, as amended (42 U.S.C. 2138). Sections 50.23, 50.35, 50.55, and 50.56 also issued under sec. 185, 68 Stat. 955 (42 U.S.C. 2235). Sections 50.33a, 50.55a and Appendix Q also issued under sec. 102, Pub. L. 91-190, 83 Stat. 853 (42 U.S.C. 4332). Sections 50.34 and 50.54 also issued under Pub. L. 97-415, 96 Stat. 2073 (42 U.S.C. 2239). Section 50.78 also issued under sec. 122, 68 Stat. 939 (42 U.S.C. 2152). Sections 50.80 - 50.81 also issued under sec. 184, 68 Stat. 954, as amended (42 U.S.C. 2234). Appendix F also issued under sec. 187, 68 Stat. 955 (42 U.S.C. 2237).

2. In § 50.34, paragraph (a)(4) is revised, paragraph (g) is redesignated as paragraph (h), and a new paragraph (g) is added to read as follows:

§ 50.34 Contents of applications; technical information.

(a) * * *

(4) A preliminary analysis and evaluation of the design and performance of structures, systems, and components of the facility with the objective of assessing the risk to public health and safety resulting from operation of the facility and including determination of the margins of safety during normal operations and transient conditions anticipated during the life of the facility, and the adequacy of structures, systems, and components provided for the prevention of accidents and the mitigation of the consequences of accidents. Analysis and evaluation of ECCS cooling performance and the need for high point vents following postulated loss-of-coolant accidents must be performed in accordance with the requirements of § 50.46

and § 50.46a of this part for facilities for which construction permits may be issued after December 28, 1974.

* * * * *

(g) *Combustible gas control*. All applicants for a construction permit or operating license under Part 50 of this chapter, and all applicants for design approval, design certification, or license under part 52 of this chapter, whose application was submitted after [EFFECTIVE DATE OF RULE], shall include the descriptions of the equipment, systems, and analyses required by § 50.44 as a part of their application.

* * * * *

3. Section 50.44 is revised to read as follows:

§ 50.44 Combustible gas control in containment.

(a) *Definitions*.

(1) *Inerted atmosphere* means a containment atmosphere with less than 4 percent oxygen by volume.

(2) *Mixed atmosphere* means that the concentration of combustible gases in any part of the containment is below a level that supports combustion or detonation that could cause loss of containment integrity.

(b) *Requirements for currently-licensed reactors*. Each boiling or pressurized light-water nuclear power reactor with an operating license on [EFFECTIVE DATE] must comply with the following requirements, as applicable:

(1) *Mixed atmosphere*. All containments must have a capability for ensuring a mixed atmosphere.

(2) *Combustible gas control*.

(i) All boiling water reactors with Mark I or Mark II type containments must have an inerted atmosphere.

(ii) All boiling water reactors with Mark III type containments and all pressurized water reactors with ice condenser containments must have the capability for controlling combustible gas generated from a metal-water reaction involving 75 percent of the fuel cladding surrounding the active fuel region (excluding the cladding surrounding the plenum volume) so that there is no loss of containment structural integrity.

(3) *Equipment Survivability.* All boiling water reactors with Mark III containments and all pressurized water reactors with ice condenser containments that do not rely upon an inerted atmosphere inside containment to control combustible gases must be able to establish and maintain safe shutdown and containment structural integrity with systems and components capable of performing their functions during and after exposure to the environmental conditions created by the burning of hydrogen. Environmental conditions caused by local detonations of hydrogen must also be included, unless such detonations can be shown unlikely to occur. The amount of hydrogen to be considered must be equivalent to that generated from a metal-water reaction involving 75 percent of the fuel cladding surrounding the active fuel region (excluding the cladding surrounding the plenum volume).

(4) *Monitoring*.

(i) Equipment must be provided for monitoring oxygen in containments that use an inerted atmosphere for combustible gas control. Equipment for monitoring oxygen must be functional, reliable, and capable of continuously measuring the concentration of oxygen in the containment atmosphere following a beyond design-basis accident for combustible gas control and accident management, including emergency planning.

(ii) Equipment must be provided for monitoring hydrogen in the containment. Equipment for monitoring hydrogen must be functional, reliable, and capable of continuously measuring the concentration of hydrogen in the containment atmosphere following a beyond design-basis accident for accident management, including emergency planning.

(5) *Analyses*. Each holder of an operating license for a boiling water reactor with a Mark III type of containment or for a pressurized water reactor with an ice condenser type of containment, shall perform an analysis that:

(i) Provides an evaluation of the consequences of large amounts of hydrogen generated after the start of an accident (hydrogen resulting from the metal-water reaction of up to and including 75 percent of the fuel cladding surrounding the active fuel region, excluding the cladding surrounding the plenum volume) and include consideration of hydrogen control measures as appropriate;

(ii) Includes the period of recovery from the degraded condition;

(iii) Uses accident scenarios that are accepted by the NRC staff. These scenarios must be accompanied by sufficient supporting justification to show that they describe the behavior of the reactor system during and following an accident resulting in a degraded core.

(iv) Supports the design of the hydrogen control system selected to meet the requirements of this section; and,

(v) Demonstrates, for those reactors that do not rely upon an inerted atmosphere to comply with paragraph (b)(2)(ii) of this section, that:

(A) Containment structural integrity is maintained. Containment structural integrity must be demonstrated by use of an analytical technique that is accepted by the NRC staff in accordance with § 50.90. This demonstration must include sufficient supporting justification to show that the technique describes the containment response to the structural loads involved.

This method could include the use of actual material properties with suitable margins to account for uncertainties in modeling, in material properties, in construction tolerances, and so on; and

(B) Systems and components necessary to establish and maintain safe shutdown and to maintain containment integrity will be capable of performing their functions during and after exposure to the environmental conditions created by the burning of hydrogen, including local detonations, unless such detonations can be shown unlikely to occur.

(c) *Requirements for future applicants and licensees*. The requirements in this paragraph apply to all construction permits or operating licenses under this part, and to all design approvals, design certifications, combined licenses or manufacturing licenses under part 52 of this chapter, any of which are issued after [EFFECTIVE DATE].

(1) *Mixed atmosphere*. All containments must have a capability for ensuring a mixed atmosphere.

(2) *Combustible gas control*. All containments must have an inerted atmosphere or limit hydrogen concentrations in containment during and following an accident that releases an equivalent amount of hydrogen as would be generated from a 100 percent fuel clad-coolant reaction, uniformly distributed, to less than 10 percent and maintain containment structural integrity and appropriate mitigating features.

(3) *Equipment Survivability*. Containments that do not rely upon an inerted atmosphere to control combustible gases must be able to establish and maintain safe shutdown and containment structural integrity with systems and components capable of performing their functions during and after exposure to the environmental conditions created by the burning of hydrogen. Environmental conditions caused by local detonations of hydrogen must also be included, unless such detonations can be shown unlikely to occur. The amount of hydrogen to

be considered must be equivalent to that generated from a fuel clad-coolant reaction involving 100 percent of the fuel cladding surrounding the active fuel region.

(4) *Monitoring*.

(i) Equipment must be provided for monitoring oxygen in containments that use an inerted atmosphere for combustible gas control. Equipment for monitoring oxygen must be functional, reliable, and capable of continuously measuring the concentration of oxygen in the containment atmosphere following a beyond design-basis accident for combustible gas control and accident management, including emergency planning.

(ii) Equipment must be provided for monitoring hydrogen in the containment. Equipment for monitoring hydrogen must be functional, reliable, and capable of continuously measuring the concentration of hydrogen in the containment atmosphere following a beyond design-basis accident for accident management, including emergency planning.

(5) *Analyses*. An applicant shall perform an analysis that demonstrates containment structural integrity. This demonstration must use an analytical technique that is accepted by the NRC staff and include sufficient supporting justification to show that the technique describes the containment response to the structural loads involved. The analysis must address an accident that releases hydrogen generated from 100 percent fuel clad-coolant reaction accompanied by hydrogen burning. Systems necessary to ensure containment integrity must also be demonstrated to perform their function under these conditions.

4. Section 50.46a is added to read as follows:

§ 50.46a Acceptance criteria for reactor coolant system venting systems.

Each nuclear power reactor must be provided with high point vents for the reactor coolant system, for the reactor vessel head, and for other systems required to maintain adequate core cooling if the accumulation of noncondensible gases would cause the loss of

function of these systems. High point vents are not required for the tubes in U-tube steam generators. Acceptable venting systems must meet the following criteria:

(a) The high point vents must be remotely operated from the control room.

(b) The design of the vents and associated controls, instruments and power sources must conform to Appendix A and Appendix B of this part.

(c) The vent system must be designed to ensure that:

(1) The vents will perform their safety functions, and

(2) There would not be inadvertent or irreversible actuation of a vent.

PART 52-EARLY SITE PERMITS; STANDARD DESIGN CERTIFICATIONS; AND COMBINED LICENSES FOR NUCLEAR POWER PLANTS

5. The authority citation for Part 52 continues to read as follows:

AUTHORITY: Secs. 103, 104, 161, 182, 183, 186, 189, 68 Stat.936, 948, 953, 954, 955, 956, as amended, sec. 234, 83 Stat. 444, as amended (42 U.S.C. 2133, 2201, 2232, 2233, 2236, 2239, 2282); secs. 201, 202, 206, 88 Stat. 1242, 1244, 1246, as amended (42 U.S.C. 5841, 5842, 5846).

6. In § 52.47, paragraph (a)(1)(ii) is revised to read as follows:

§ 52.47 Contents of applications

(a) * * *

(1) * * *

(ii) Demonstration of compliance with any technically relevant portions of the Three Mile Island requirements set forth in 10 CFR 50.34(f) except paragraphs (f)(1)(xii), (f)(2)(ix) and (f)(3)(v);

* * * * *

Dated at Rockville, Maryland, this ___ day of _____, 2002.

For the Nuclear Regulatory Commission.

_____
Annette Vietti-Cook
Secretary of the Commission