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NUCLEAR REGULATORY COMMISSION

10 CFR Parts 50 and 52

RIN 3150-AG76

Combustible Gas Control in Containmentment

AGENCY: Nuclear Regulatory Commission.

ACTION: Final rule.

SUMMARY: The Nuclear Regulatory Commission (NRC) is amending its regulations for combustible gas control in power reactors applicable to current licensees and is consolidating combustible gas control regulations for future reactor applicants and licensees. The final rule 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 risk significance. This action stems from the NRC's ongoing effort to risk-inform its regulations, and is intended to reduce the regulatory burden on present and future reactor licensees. Additionally, the final rule grants in part and denies in part a petition for rulemaking (PRM-50-68) submitted by Mr. Bob Christie. This notice constitutes final NRC action on PRM-50-68. The final rule also denies part of a petition for rulemaking (PRM-50-71) submitted by the Nuclear Energy Institute. The remaining issue in PRM-50-71 that is not addressed by this final rule will be evaluated in a separate NRC action. The NRC has updated a guidance document, "Control of Combustible Gas Concentrations in Containmentment" to address changes in the rule. A draft regulatory guide containing the revisions was published for comment with the proposed rule.

EFFECTIVE DATE: October 16, 2003.

FOR FURTHER INFORMATION CONTACT:

Richard Dudley, Office of Nuclear Reactor Regulation, Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone (301) 415-1116; e-mail: rfd@nrc.gov.

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I. Background

On October 27, 1978 (43 FR 50162), the NRC adopted a new rule, 10 CFR 50.44, specifying the standards for combustible gas control systems. The rule required 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. Subsequently, the NRC 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 NRC 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 noncondensable gases from the reactor vessel (46 FR 58484; December 2, 1981).