

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 NRC found that containment loadings associated with long term hydrogen concentrations are no worse than those considered in the first 24 hours and therefore, are not risk-significant. The NRC 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 NRC eliminates 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 NRC 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 also is needed to inert the containment.

The NRC 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, current nuclear power plant licensees 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 NRC is not requiring 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 final rule amends § 50.44 to codify the existing regulatory practice of monitoring oxygen in currently-licensed nuclear power plant 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 significant 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 as an input in emergency response decision making.

The final rule reclassifies oxygen monitors as non safety-related components. Currently, as recommended by the NRC'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 NRC 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 NRC believes 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 relaxation may require a license amendment at some facilities. 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 final rule maintains the existing requirement in § 50.44(b)(1) for monitoring hydrogen in the containment atmosphere for all currently-licensed nuclear power plants. 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 made commitments to comply with design and qualification criteria for hydrogen monitors specified 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 final rule reclassifies the hydrogen monitors as non safety-related components for currently-licensed nuclear power plants. With the elimination of the design-basis LOCA hydrogen release (see Item B. earlier), the hydrogen monitors are no longer required to support mitigation of design-basis accidents. Therefore, the hydrogen monitors do not meet the definition of a safety-related component as defined in § 50.2. This is consistent with the NRC's determination 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