

because it took them away from more important tasks that needed to be implemented in the near term while the monitoring did not need to be initiated for a longer period. The NRC has determined that performance-based functional requirements rather than prescriptive requirements achieve the desired goal of hydrogen monitor functionality while giving licensees an opportunity to better use operators' time during an accident. The noted 90 minutes come from the time licensees found was needed to get the monitors running in a manner that still met the goal of monitoring hydrogen levels and allowed sufficient time for other operator actions based on severe accident emergency operating procedures. Thus, the 90 minute time period was a result of changing to a performance-based approach and was not arbitrarily specified as the time within which the operators had to act.

The individual also stated that the proposed rule was reducing "defense in depth" and that if a utility cannot afford to operate and maintain its nuclear power reactors with the requisite caution and oversight, then the utility should not operate them at all. The NRC disagrees with the commenter's assertion that the amended regulations do not provide adequate defense-in-depth. Defense-in-depth continues to be a prime consideration in NRC decision making. The NRC makes its decisions considering public safety first. Only after public safety is ensured are other issues such as public confidence and reduction of unnecessary burden considered. Defense-in-depth is an element of the NRC's safety philosophy that employs successive measures to prevent accidents or mitigate damage if a malfunction, accident, or naturally caused event occurs at a nuclear facility. It provides redundancy as well as the philosophy of a multiple-barrier approach against fission product releases. Defense-in-depth does not mean that equipment installed in a nuclear power plant never should be removed. Adequate defense-in-depth may be achieved through multiple means or paths.

The commenter also questioned whether the NRC staff has adequate data to demonstrate that the amount of residual and radiolytically-generated combustible gases generated during a design-basis LOCA would not be risk-significant—especially if the LOCA occurred in a plant with older fuel and SSCs than were present during the accident at Three Mile Island, Unit 2. The NRC disagrees with the commenter's assertion that insufficient information is known about hydrogen

generation to support amending the current regulations. The amount of hydrogen generated during a design-basis LOCA is not affected by the relative age or vintage of reactor fuel or SSCs. The NRC has developed significant data and insights on the behavior of design-basis and severe accidents after the TMI-2 accident. In amending § 50.44 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 NRC devoted significant resources and 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. One of the insights from these studies is confirmation that the hydrogen release postulated from a design-basis LOCA was not risk-significant because it would not lead to early containment failure. In addition, it was found that the vast majority of the risk associated with hydrogen combustion was from beyond design-basis (e.g., severe) accidents. The amended requirements are based on the NRC's careful consideration of the post-Three Mile Island information.

H. Passive Autocatalytic Recombiners

An individual questioned why the United States was allowing the removal of recombiners while the French are requiring the installation of passive autocatalytic recombiners in their reactors. The NRC has determined that passive autocatalytic recombiners (PARs) do not need to be considered for U.S. PWRs with large-dry containments or sub-atmospheric containments. This conclusion was drawn after applying the quantitative and qualitative criteria in the form of a framework for risk-informed changes to technical requirements of 10 CFR Part 50 (See attachment 1, SECY-00-0198). The NRC found that hydrogen combustion is not a significant threat to the integrity of large, dry containments or sub-atmospheric containments when compared to the 0.1 conditional large release probability of the framework

document. In SECY-00-0198, the NRC also concluded that additional combustible gas control requirements for currently licensed large-dry and sub-atmospheric containments were unwarranted.

I. Reactor Venting

An individual expressed concern for the elimination of the requirement prohibiting venting the reactor coolant system if it would aggravate the challenge to containment. According to the comment, the venting could cause an increase in the radiological effluents released off site and an increase in public exposure. The NRC disagrees with the individual's conclusion. As noted in section III.F of this **SUPPLEMENTARY INFORMATION**, the requirement to install high point vents was imposed by the 1981 amendment to § 50.44. This requirement permitted venting of noncondensable gases that 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 noncondensable 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 noncondensable gases from the vessel allows emergency core cooling flow to reach the damaged reactor core and thus, prevents further accident progression.

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. Although the release of noncondensable and combustible gases from the reactor coolant system could, 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 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 or cause an increase in the radiological effluents released off site that could potentially increase public radiation exposure. However, such venting may reduce the likelihood of further core damage. The reduction in core damage would reduce both the generation of combustible gases and the magnitude of the radiological source term that could be released, thus