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U. S. Nuclear Regulatory Commission
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Subject: Arkansas Nuclear One - Units 1 and 2
Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-6
Proposed Change to Requirements Regarding Containment
Hydrogen Monitors for Arkansas Nuclear One, Units 1 & 2

Gentlemen:

Commitments associated with Arkansas Nuclear One, Units 1 and 2, (ANO-1 & 2) regarding containment hydrogen monitors were the subject of Confirmatory Orders dated March 14, 1983. The Orders modified the operating licenses for ANO-1 and ANO-2 to require indication of hydrogen concentrations in containment within 30 minutes of the initiation of safety injection as described in Attachment 6 to Item II.F.1 in NUREG-0737, "Clarification of TMI Action Plan Requirements."

This submittal requests relief from the 30-minute requirement for indication of hydrogen concentration in containment for both ANO-1 & 2. Entergy proposes to extend the time available for placing the hydrogen monitors into service from 30 minutes to 90 minutes.

REGULATORY COMMITMENT TO THE NRC

The following commitment is made to support extending the time requirement for providing indication of hydrogen concentration in containment following the initiation of safety injection:

Procedures have been established for ensuring that indication of hydrogen concentration in the containment atmosphere is available in a sufficiently timely manner to support the role of the information in the Arkansas Nuclear One Emergency Plan (and related procedures) and related activities such as guidance for severe accident management. Hydrogen monitoring will be initiated based on: 1) the appropriate priority for establishing indication of hydrogen concentration within containment in relation to other activities in the control room, 2) the use of the indication of hydrogen concentration by decision makers for severe accident

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management and emergency response, and 3) insights from experience or evaluation pertaining to possible scenarios that result in significant generation of hydrogen that would be indicative of core damage or a potential threat to the integrity of the containment building. Affected licensing basis documents and other related documents will be appropriately revised and/or updated in accordance with applicable NRC regulations.

DISCUSSION

The primary function of the hydrogen monitoring system is to identify when it is appropriate to actuate the hydrogen recombiners during design basis events. For design basis accidents the potential need for actuation of the hydrogen recombiners does not occur for greater than 24 hours. For severe accidents, which are beyond design basis events, there are no additional operator actions identified in the emergency operating procedures that would rely on information from the hydrogen monitoring system. In fact, the hydrogen recombiners are not considered to be effective for severe accidents and no credit is taken for their use. While the hydrogen monitoring system provides useful information for longer term post-damage assessment of the core, the system is not utilized to initiate any mitigating actions in the early stages of an accident. Other parameters are used to initiate operator actions to mitigate core damage; therefore, use of the hydrogen monitoring system in the early stages of an accident would only be confirmatory to other existing parameter indication.

The following information is provided to clarify the licensing basis for extending the 30-minute requirement to 90 minutes. Each of the three factors included in the commitment text will be briefly discussed.

- 1) What is the appropriate priority for establishing indication of hydrogen concentration within containment in relation to other activities in the control room?*

The ANO emergency operating procedure philosophy is to prioritize control room operator actions in the order of their hierarchy, such that actions which are less important to safety will not be placed before more important safety functions where timely action is needed. It is appropriate to delay operator actions necessary to initiate hydrogen monitoring until safety significant accident assessment and mitigation actions are complete. Upon indication of a loss of coolant accident, hydrogen monitor startup should not be one of the control room operator's most immediate actions.

- 2) How does the delay impact the use of the indication of hydrogen concentration by decision makers for severe accident management (SAM) and emergency response?*

The SAM guidelines contain instructions for utilizing containment hydrogen concentration data if known; however, other indications are available that provide the information necessary to determine the degree of plant damage in the absence of hydrogen concentration data. These indications are readily available without operator

action and include core exit thermocouples, RCS pressure and temperature, containment radiation monitoring, containment pressure and temperature, reactor vessel level, and excore detectors.

As discussed further in question #3 below, significant amounts of hydrogen are not expected to be generated within 90 minutes of a small break LOCA; therefore, there is no need for hydrogen monitors within the first 90 minutes in this scenario. It is possible to generate significant amounts of hydrogen within the first 90 minutes for a medium/large break LOCA although this accident pathway represents only a small percentage of the total population of accidents that may lead to core damage. However, for medium/large break LOCAs the actions required by the SAM guidelines, such as the actuation of containment spray and containment cooling, will have already been taken based on other parameters regardless of whether or not the containment hydrogen concentration is known. Therefore, the absence of hydrogen monitoring for the first 90 minutes of a medium/large break LOCA would have no negative impact on the decision making process.

Extending the 30-minute requirement to 90 minutes will have no adverse impact on the implementation of the emergency plan or emergency plan implementing procedures. Other indications, as discussed above, are available to the operators for use in recognizing/classifying emergencies and issuing protective action recommendations to offsite authorities. Indication of hydrogen concentrations within containment would only be confirmatory to other available information.

- 3) *What are the insights from experience or evaluation pertaining to possible scenarios that result in significant generation of hydrogen that would be indicative of core damage or a potential threat to the integrity of the containment building?*

For severe accidents, significant amounts of hydrogen are not expected to be generated in the early stages (less than 90 minutes) of a small break LOCA. This was shown by reviews of the TMI-2 accident in the Rogovin report¹ and the Kemeny Commission report² which both document that core uncover did not occur until approximately 2 hours after plant trip. This result is consistent with more generalized evaluations of small break LOCAs. Significant amounts of hydrogen could not be generated until sometime after core uncover. Based on this understanding of the small break LOCA scenario, it can be effectively eliminated from consideration in providing a basis for the need to have hydrogen sampling available within 90 minutes.

The remaining severe accident scenarios that may lead to a significant production of hydrogen prior to 90 minutes include only the medium and large break LOCAs. This set of accident initiators represents a small percentage of the population of accidents that may lead to core damage. In addition, the medium and large break LOCAs do not

¹ NUREG/CR-1250, January 1980, "Three Mile Island, A Report to the Commission and to the Public"

² Executive Order 12130, October 30, 1979, "Final Report of the President's Commission on the Accident at Three Mile Island"

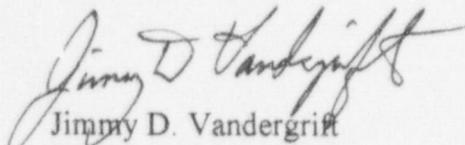
all result in the production of significant quantities of hydrogen during core damage. The right conditions must be maintained to allow the core to sustain a metal-water reaction. This further reduces the potential accident initiators that could produce significant quantities of hydrogen within 90 minutes.

In order to implement the one-hour extension, only minor revisions will be required to the emergency operating procedures, the SAM guidelines and the Safety Analysis Report. Revisions will not be necessary for the technical specifications or other licensing basis documents.

RELATED CONSIDERATION

Entergy believes that the requirements associated with the post accident sampling system (PASS), also required by NUREG-0737, were established in a manner similar to the hydrogen monitoring requirements. Therefore, a similar approach should be utilized by the NRC for issuing generic PASS relief. Over the past decade, new information has been developed in the knowledge of fission product behavior during severe accidents. These include new insights into the content, timing and physical nature of the release, as well as the fission product transport, deposition and removal. As a consequence of these insights, the timing of the sampling requirements and the early use of the PASS system should be re-evaluated. It would appear that most, if not all, sampling could be accomplished by grab samples.

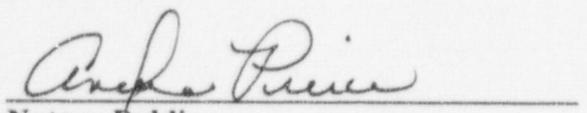
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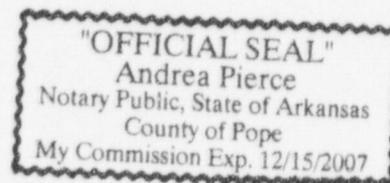

Jimmy D. Vandergriff
Director, Nuclear Safety

JDV/dwb

To the best of my knowledge and belief, the statements contained in this submittal are true.

SUBSCRIBED AND SWORN TO before me, a Notary Public in and for
Pope County and the State of Arkansas, this 9th day of September,
1998.


Notary Public
My Commission Expires 12/15/2007



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