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SUBJECT: Requests relief from 30-minute requirement for indication of hydrogen concentration in containment for Oconee Units 1,2 & 3.

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August 4, 1999

U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Document Control Desk

Subject: Oconee Nuclear Station
Docket Numbers 50-269, 270, and 287
Proposed Change to Requirements Regarding Containment Hydrogen Monitors for Oconee Nuclear Station, Units 1, 2, and 3 (NUREG-0737, Item II.F.1.6)

Duke Energy requests relief from the 30-minute requirement for indication of hydrogen concentration in containment for Oconee Units 1, 2, and 3. This request is made in accordance with NRR Project Manager Guidance for risk-informed confirmatory orders on post-accident hydrogen monitoring. Duke Energy proposes to extend the time available for placing the hydrogen monitors in service from 30 minutes to 90 minutes. This request is consistent with a similar request made by Entergy Operations for Arkansas Nuclear One (ANO), Units 1 and 2. NRC granted that request by providing a confirmatory order modifying the post-TMI requirement pertaining to containment hydrogen monitors for ANO by letter dated September 28, 1998. Duke Energy's commitment made in response to TMI Action Plan Item II.F.1.6 is similar to that made for ANO.

Commitments associated with Oconee Nuclear Station, Units 1, 2, and 3 regarding containment hydrogen monitors were the subject of a Confirmatory Order dated March 18, 1983. The order modified the operating licenses for Oconee Units 1, 2, and 3 to require indication of hydrogen concentration in containment within 30 minutes following a safety injection as described in Attachment 6 to Item II.F.1 in NUREG-0737, "Clarification of TMI Action Plan Requirements."

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Duke Energy's proposed revision to the current post-accident hydrogen monitoring requirements and the basis for the modified confirmatory order are provided in the Attachment. If there are any questions, you may contact Boyd Shingleton at (864) 885-3428.

Very truly yours,

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Attachment 1
Oconee Nuclear Station

Proposed Revision to Confirmatory Order and Basis for Modifying Confirmatory Order

Duke Energy proposes that the Confirmatory Order be modified as follows:

> "The Licensee may elect to either maintain the 30-minute time limit for indication of hydrogen in containment, as described by TMI Action Plan Item II.F.1, Attachment 6, in NUREG-0737 and required by the Confirmatory Order of March 18, 1983, or adopt a risk-informed functional requirement. The applicable functional requirement is as follows:
>
> 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 Oconee Nuclear Station 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 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."

Duke Energy will operate and maintain the containment hydrogen monitors for Oconee Units 1, 2 and 3 in accordance

with the applicable functional requirements described above. The adoption of these functional requirements will initially result in extending the time requirements for hydrogen monitors from 30 minutes to 90 minutes after the initiation of safety injection.

BASIS FOR MODIFIED CONFIRMATORY ORDER

The primary function of the hydrogen monitoring system is to identify when it is appropriate to actuate the hydrogen recombiners during design basis accidents. For design basis accidents the potential need for actuation of the hydrogen recombiners does not occur until approximately 7 days. Post accident hydrogen concentrations are indicated by the Containment Hydrogen Monitoring System (CHMS). This instrumentation provides two redundant channels of hydrogen monitoring that can monitor hydrogen concentrations at different levels of the containment. Should both trains of hydrogen monitoring be inoperable and no other means of hydrogen measurement be available, ONS procedures require the Containment Hydrogen Recombiner System (CHMS) be placed in service after 7 days from initiation of the accident to assure hydrogen concentrations are not exceeded.

The hydrogen generation which occurs following a design basis LOCA is a slow process driven by sump radiolysis and metal corrosion. ONS calculations have shown that many days are required to reach the regulatory limit of 4 volume percent. A hydrogen concentration slightly above 4 volume percent is generally accepted as a lower flammability limit. ONS analysis shows that using conservative assumptions, post-LOCA hydrogen concentrations reach 3 volume percent in approximately 168 hours (7 days) and 4 volume percent in approximately 310 hours (13 days).

For severe accidents, significant amounts of hydrogen are not expected to be generated in the early stages of a small break LOCA (less than 90 minutes). The remaining severe accident

scenarios that may lead to significant production of hydrogen 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 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. For medium and large break LOCAs, the actions required by Severe Accident Management (SAM) guidelines, such as the actuation of reactor building spray and reactor building 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 or large break LOCA would have no negative impact on the decision making process.

The proposed one hour operator delay to place the hydrogen monitors into service following a safety injection will provide a reasonable margin for the operators to complete the accident assessment and mitigation duties, before redirecting their attention to the relatively longer term recovery actions such as actuating the hydrogen recombiners. This one-hour delay will have a positive impact on the ability of the operators to concentrate on their more immediate actions while having no negative impact on the much longer-term actions that will not be needed for greater than 24 hours. Therefore, this change should result in an improvement in public health and safety.