

Supplemental RAIs 5.2-1, 5.2-2, and 5.2-4

Supplemental RAI 5.2-1:

In RAI 5.2-1(b), the staff asked GE to explain how the proposed Technical Specification (TS) limit and alarm limit for the unidentified leakage of 5 gpm are consistent with the 1 gpm criterion specified in Positions C.2 and C.5 of RG 1.45. In GE's RAI response, MFN 06-085, and in a conference call on January 16, 2007, GE maintained its position for the TS limit and alarm limit being specified as 5 gpm based on its historical leakage detection/alarm limits being specified for BWRs. GE stated that Positions C.2 and C.5 only specified the "sensitivity" of the instrument rather than the TS limit or alarm limit, and stated that the ESBWR instrument has the sensitivity of 1 gpm. RG 1.45 (page 1.45-2) provides guidance on the "detector sensitivity," and states that "sumps and tanks used to collect unidentified leakage and air cooler condensate should be instrumented to alarm for increases of from 0.5 to 1.0 gpm." The sensitivity of 1 gpm, claimed by ESBWR design, is not demonstrated in the alarm set point, or in the TS limit, and is not explicitly shown being used by operators under any procedures. The staff believes that the alarm limit needs to be set as low as practicable to provide an early warning signal to alert operator taking actions. The current ESBWR alarm limit of 5 gpm is not acceptable because it is not consistent with RG 1.45 stated above, nor it serves the intended function to alert operator taking actions before the TS limit is reached.

Provide and justify a revised alarm limit for the unidentified leakage. Revise the DCD, Tier 2, Section 5.2.5.4, accordingly.

Supplemental RAI 5.2-2:

In GE's response to RAI 5.2-2, MFN 06-085, GE stated that an evaluation of the effects of relative humidity including that which is attributable to the proposed leakage limits up to 5 gpm would be included as part of equipment qualification requirements in the procurement of equipment. The staff reviewed the current equipment qualification and found that it was not adequate to address the concern of long term leakage. Under current TS, the plant operators could continuously operate the plant for years with unidentified reactor coolant system (RCS) leakage of less than 5 gpm. In response to the RAI, GE stated that the design of ESBWR has been improved to reduce the likelihood of leaks resulting from stress corrosion cracking (SCC), and historically, good operator practice plays a role in the event of an anomaly in unidentified leakage. Typical operator practice will investigate, record, track, evaluate trends of the leakage, and take necessary measures to locate, assess, and repair the source of the leakage. The staff agreed that the material design improvement can reduce the likelihood of leaks resulting from SCC, but the improvement cannot eliminate all the possible leaks. The staff also agreed that good operator actions at low level leakage below the TS limit are acceptable measures to address the concern of long term leakage. To account for the good operator practice, every COL applicant should have operating procedures to manage the low level RCS leakage, and the alarm limit should be set as low as practicable to provide an early warning signal to the operators to implement the procedures. Therefore, it needs a new COL action item, and an appropriate alarm limit in the design.

In the conference calls, dated August 14, 2006, and January 16, 2007, the applicant agreed to add a COL holder item in Revision 3 of DCD Section 5.2.6. The COL holder item now states that "operators will be provided with procedures to assist in monitoring, recording, trending, determining the source of leakage, and evaluating potential corrective action." The staff find

this statement unacceptable for the following reasons.

A. Revise the COL Holder item to state that “The COL Holder is responsible for the development of a procedure ...” rather than the current statement that the “Operators will be provided with procedures ...”

B. Revise the COL Holder item to indicate that the procedures are for low level unidentified leakage, (lower than the TS limit). {This RAI response is associated with the above RAI 5.2-1 supplement resolution as it needs an appropriate alarm limit in the design to provide an early warning signal to the operators to implement the procedures.}

Supplemental RAI 5.2-4:

In RAI 5.2-4 as related to RG 1.45 Regulatory Position C.7, the staff asked the applicant to clarify whether the procedures that will provide operator guidance on converting leakage instrument indications into a common leakage rate equivalent were generic for the ESBWR design or to be developed by COL applicants. In GE’s response, MFN 06-085, GE stated that the procedures to convert different sources of leakage into a common rate equivalent would be provided by COL applicants. This is a COL action item to be added to DCD Section 5.2.6. Accordingly, GE provided a markup page for Section 5.2.6 in the RAI response. However, when reviewing DCD Revision 2, the staff could not find the promised COL action item. In a conference call, dated January 16, 2007, GE agreed to incorporate the change in Revision 3 of the DCD. The staff reviewed Revision 3 and found that DCD Section 5.2.6 stated “Operators will be provided with a procedure to determine the identified and unidentified leakage in order to establish whether the leakage rates are within the allowable TS.” The staff found the statement not acceptable on two aspects.

A. Revise the COL Holder item to state that “The COL Holder is responsible for the development of a procedure ...” rather than the current statement that the “Operators will be provided with procedures ...”

B. Revise the COL Holder item to better characterize the purpose of the procedures. The purpose is to convert different sources of leakage (such as sump pump activity, sump level, condensate flow rate, and radioactivity) into a common rate equivalent (gpm). This leak rate information can be used by operators to monitor the leakage and to manage the leakage well below the TS limit. The purpose of the procedures is not limited to what the statement indicated to establish whether the leakage rates are within the allowable TS.