RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.:	**319-8360**
SRP Section:	**03.09.03 - ASME Code Class 1, 2, and 3 Components**
Application Section:	**3.9.3**
Date of RAI Issue:	**11/24/2015**

Question No. 03.09.03-3

The requirements in 10 CFR 50.55a and 10 CFR Part 50, Appendix A, GDC 1 relate to structures and components being designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. One aspect of this design, as described further in SRP Section 3.9.3, is the evaluation of stresses based on an appropriate set of load combinations. In DCD Tier 2, Table 3.9-2, Service Level D has the “DF” load included in the load combination. In the Legend in Note (2), the applicant provides the definition of DF loads to be dynamic system loadings associated with pipe breaks (not eliminated by a leak-before-break analysis). Note (2) is not clear whether the DF load includes loadings associated with relief valve opening and closure in a closed system. To the extent that these valve operations are expected following the pipe break referenced in this load combination, the applicant is requested to describe how these loads are considered in the analysis.

Response

The DF loadings defined in Note (2) for DCD Tier 2, Table 3.9-2 are associated with the loadings from pipe breaks and the loadings from relief valve actuation, such as POSRV actuation. The only event which assumes relief valve (POSRV) actuation following a pipe break is the feedwater system pipe break. The loadings induced by the pipe break and the POSRV actuation as a result of the event are applied to the loading combinations as described in DCD Tier 2 Subsection 3.9.3.1.

DCD Tier 2, Table 3.9-2 will be revised to define the DF loading explicitly and to differentiate between transient loading conditions (i.e., Level B conditions), that also include relief valve actuation loading; designated as DFL in Table 3.9-2.

Impact on DCD

DCD Tier 2, Table 3.9-2 will be revised as indicated in the Attachment.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Report.

Table 3.9-2

Loading Combinations for ASME Code Class 1, 2, and 3 Components(1) and Component Supports

Condition	Design Loading(2) Combination
Design	PD + DW + IRWST
Level A (Normal)(3)	PO + DW
Level B (Upset)(3)	PO + DW + IRWST + DFL
Level C (Emergency)	PO + DW + DE
Level D (Faulted)	PO + DW + ~~SRSS (SSE + (DF + IRWST))~~ SRSS(SSE + DF + IRWST) (4)

(1) For piping, see Tables 3.9-10, 3.12-1, and 3.12-2.

(2) Legend:

PD = design pressure
PO = operating pressure
DW = deadweight
SSE = safe shutdown earthquake
DE = dynamic system loadings associated with the emergency condition
DF = dynamic system loadings associated with pipe breaks (not eliminated by a leak-before-break analysis) or, POSRV actuation
IRWST = In-containment refueling water storage tank discharge loads

(3) As required by the ASME Section III, other loads, such as thermal transient, and thermal gradient, require consideration in addition to the primary stress producing loads listed. SSE is considered in equipment fatigue evaluations in accordance with Subsection 3.7.3.1.

DFL = Dynamic fluid loads are occasional loads associated with hydraulic transients caused by events such as valve actuation (safety or relief valve discharge, rapid valve opening/closing), water hammer, or steam hammer.

(4) Detailed loading combinations of ASME Code Class 1 components and component supports are described in Subsection 3.9.3.1.