REVISED 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.:	**175-8034**
SRP Section:	**05.04.12 – Reactor Coolant System High Point Vents**
Application Section:	**5.4.12**
Date of RAI Issue:	**08/28/2015**

Question No. 05.04.12-3

10 CFR 50.34(f)(2)(vi) requires, in part, that high point vent operation does not lead to an unacceptable increase in LOCA probability. Section 10 CFR 50.46, subpart (b)(5) requires the ECCS to be capable of decay heat removal. In addition, SRP Section 5.4.12, SRP Acceptance Criterion 6 states: “The size of the vent should be smaller than the size corresponding to the definition of a LOCA (Appendix A to 10 CFR Part 50, 10 CFR 52.47(a)(1)(ii), and 10 CFR 52.79(b)) to avoid unnecessary challenges to the ECCS, unless the applicant provides justification for a larger size.”

DCD Tier 2, Section 5.4.12 does not discuss a break in the pressurizer vent line or present supporting LOCA analyses that would demonstrate compliance with the ECCS acceptance criteria in 10 CFR 50.46. In addition, Subsection 5.4.12.3, “Performance Evaluation,” states that a break in the vent line on the RVCH is categorized as a small break loss-of-coolant accident (SBLOCA) and that RVCH vent break phenomena are similar to those in DCD Tier 2, Section 15.6.5; therefore, the results in Section 15.6.5 conservatively bound the RVCH vent line break. However, it is unclear how the breaks analyzed are applicable to a potential break in the RVCH vent and how their results could envelop the RVCH vent line break case. For example, the SBLOCA analyses performed in DCD Tier 2, Section 15.6.5 are for cold leg breaks (pump discharge leg and DVI line) or a break in the top of the pressurizer. In addition, a break in the RVCH line would have an area of 5.07 cm^2 (0.005 ft^2), which is considerably smaller than even the smallest break analyzed, an 18.6 cm^2 (0.02 ft^2) break in the DVI line.

Therefore, please:

a. Address a break in the pressurizer vent line, providing supporting LOCA analyses if necessary, and update the DCD as appropriate.

b. Provide justification for why the results in Section 15.6.5 conservatively envelop the RVCH vent line break scenario.

This information is needed to evaluate whether the RCGVS meets the requirements of 10 CFR 50.34(f)(2)(vi) and 10 CFR 50.46.

Response – (Rev.1)

a. SBLOCA analysis for the vent line on the pressurizer is addressed in DCD Tier 2, Subsection 15.6.5.3.3 and Table 15.6.5-8. A break in the vent line on the pressurizer will be added to DCD Tier 2, Subsection 5.4.12.3 as indicated in the attachment.

b. SBLOCA analyses have been performed with 9 different break sizes, of which the minimum break size is 0.02 ft^2 (see DCD Tier 2, Table 15.6.5-8). In addition, the break of an in-core instrument tube sized 0.003 ft^2 is also considered as one of the SBLOCAs (see DCD Tier 2, Subsection 15.6.5.3.3). All the results of SBLOCA analyses described above conclude that the SIS satisfies all the SRP acceptance criteria for SBLOCAs. The RVCH vent line break case, which is 0.0036 ft^2 (1 inch, sch 160) piping, is bounded in the break size for SBLOCA analyses; therefore, it is enveloped in the results of SBLOCA analyses.

Impact on DCD

In DCD Tier 2, Subsection 5.4.12.3 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 Environment Report.

A break in the vent line on the reactor vessel closure head (RVCH) is categorized as a small break LOCA ~~of not greater than NPS of 2.54 cm (1 in) in diameter.~~ A break phenomenon (or behavior) of the RVCH vent line is similar to the breaks that are analyzed in Subsection 15.6.5. Hence, the results presented in Subsection 15.6.5 conservatively envelop the RVCH vent line break case.

Deleted

and pressurizer

The evaluation of the reactor coolant gas vent system operation is as follows:

a. The operation is needed when venting the noncondensable in the upper reactor vessel is necessary.

b. The size of a noncondensable bubble is estimated from reading the reactor vessel water level indication.

c. Initiating and terminating system operation are manually performed in accordance with the above described conditions.

d. The temperature and pressure instrumentation is provided to detect RCS leakage and pressure buildup, respectively.

e. The operator action to open the RCGV valve may be needed to vent steam in the reactor vessel closure head or to release steam to the IRWST.

The venting operation is performed in accordance with system operating procedure for the RCGVS to discharge noncondensable gases and steam from the high point of the RCS during post-accident conditions. The system operating procedure for the RCGVS is described in Section 13.4.

5.4.12.4 Inspection and Testing Requirements

Subsection 3.9.6 describes inservice testing and inspection of valves. Subsection 5.2.4 describes inservice inspection and testing of ASME Code, Class 1 components that are part of the reactor coolant pressure boundary.