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## 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.: 311-8278

SRP Section: 03.12 - ASME Code Class 1, 2, and 3 Piping Systems and Piping Components and Their Associated Supports

Application Section:

Date of RAI Issue: 11/16/2015

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### **Question No. 03.12-5**

ASME BPV Code Section III, as mandated by 10 CFR 50.55a, requires that the effects of deadweight be accounted for in the piping analysis. DCD Section 3.12.6.11 states that "[t]he normal design practice for the APR1400 is to use a nominal cold condition gap of 1.6 mm (1/16 in) on each side of the pipe in the restrained direction." The above DCD statement does not appear to be applicable to pipe restraints that are designed to support deadweight. The applicant is requested to provide additional information on gaps that are used in deadweight support restraints.

### **Response**

As stated in DCD section 3.12.6.11, the normal design practice for the APR1400 is to use the nominal cold condition gap of 1.6mm (1/16 in) on each side of the pipe in the restrained direction. For vertical restraint supports in horizontal piping, the pipe will be in contact with the support member in the direction of gravity to support the load including deadweight. The gap between the upper side surface of the pipe and the support member is allowed to have a range up to 3.2mm (1/8 in). Clarification will be added to the DCD on the gaps for deadweight support.

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### **Impact on DCD**

DCD Tier 2 Section 3.12.6.11 will be revised as indicated in the attached markup.

### **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.

**APR1400 DCD TIER 2****3.12.6.11 Pipe Support Gaps and Clearances**

For guide type pipe supports modeled as rigid restraints in the piping analysis, the typical industry design practice is to provide small gaps between the pipe and its surrounding structural members. These small gaps allow radial thermal expansion of the pipe as well as allow rotation of the pipe at the support. The normal design practice for the APR1400 is to use a nominal cold condition gap of 1.6 mm (1/16 in) on each side of the pipe in the restrained direction. The COL applicant is to determine maximum radial thermal expansion at its design temperature (COL 3. 12(7)).

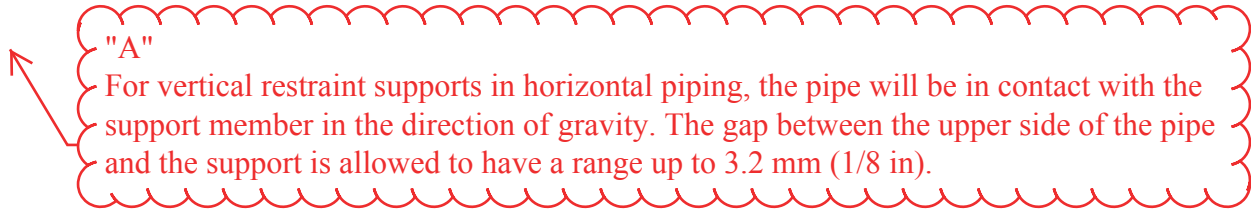
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**3.12.6.12 Instrumentation Line Support Criteria**

The design and analysis loadings, load combinations, and acceptance criteria to be used for instrumentation line supports are similar to those used for pipe supports. The applicable design loads include deadweight, thermal expansion, and seismic loadings where appropriate. The applicable loading combinations similarly follow those used for the ASME Section III Levels in Table 3.9-10 using the design loadings mentioned above. The acceptance criteria are in accordance with ASME Section III, Subsection NF for seismic Category I instrumentation lines, AISC 360-05 (Reference 14) for non-seismic instrumentation lines.

**3.12.6.13 Pipe Deflection Limits**

For standard component pipe supports using standard manufactured hardware components, the manufacturer's recommendations for limitations in its hardware are followed. The limitations are travel limits for spring hangers; stroke limits for snubbers; swing angles for rods, struts, and snubbers; alignment angles between clamps or end brackets with their associated struts and snubbers; and the variability check for variable spring supports. In addition to the manufacturer's recommended limits, allowances are made in the initial designs for tolerances on such limits. This is especially important for snubber and spring design in which the function of the support may be changed by an exceeded limit.



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For vertical restraint supports in horizontal piping, the pipe will be in contact with the support member in the direction of gravity. The gap between the upper side of the pipe and the support is allowed to have a range up to 3.2 mm (1/8 in).