
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. 05.04.12-5

10 CFR 50.49, “Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants,” requires that safety-related electric equipment is environmentally qualified. DCD Tier 2, Section 5.4.12.1 states that the RCGVS is environmentally qualified. However, the staff is unable to find discussion of the environmental qualification of the RCGVS in Tier 2, including Section 3.11, “Environmental Qualification of Mechanical and Electrical Equipment,” and Table 3.11-3, “Equipment Qualification Equipment List.” Although DCD Tier 1, Table 2.4.5-2, “Reactor Coolant Gas Vent System Component List,” shows that the safety-related gas vent valves are qualified for a harsh environment, no equivalent information is provided in DCD Tier 2. Therefore, please provide discussion on the environmental qualification of the RCGVS and update DCD Tier 2 as appropriate. This is required to allow the staff to evaluate whether the Tier 2 information for the RCGVS meets 10 CFR 50.49.

Response

The RCGVS is designed to provide a safety-grade means of remotely venting noncondensable gases from the reactor vessel closure head and the pressurizer steam space during post-accident conditions. The RCGVS valves are designed class 1E and are safety-related mechanical equipment located in harsh environments inside the reactor containment building.

Therefore, the environmental qualification of RCGVS is performed in accordance with the requirements of 10 CFR 50.49, NRC RG 1.89, and IEEE Std. 323, and equipment qualification standards that are available are also met.

The RCGVS valves will be added in Tier 2, Table 3.11-3 with correction of Tier 1, Table 2.4.5-2 as indicated in the Attachment.

Impact on DCD

DCD Tier 1, Table 2.4.5-2 and Tier 2, Table 3.11-3 will be corrected 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.

APR1400 DCD TIER 2

Table 3.11-3 (24 of 66)

Equipment Identification		Location		Required Operational Time	Environmental Condition ⁽²⁾	Radiation Condition ⁽⁶⁾	Influence of Immersion (Yes/No)	Seismic Cat.	Remark
		Building	Category ⁽¹⁾						
Reactor Coolant System (Cont.)									
RC-FE0156	Flow Element	RCB	B	N/A	N/A	N/A	N/A	I	
RC-FE0166	Flow Element	RCB	B	N/A	N/A	N/A	N/A	I	
RC-FE0176	Flow Element	RCB	B	N/A	N/A	N/A	N/A	I	
RC-FE0186	Flow Element	RCB	B	N/A	N/A	N/A	N/A	I	
RC-V0100E	Pressurizer Spray Control Valve	RCB	B	N/A	N/A	N/A	N/A	I	
RC-V0100F	Pressurizer Spray Control Valve	RCB	B	N/A	N/A	N/A	N/A	I	
RC-V0403	Reactor Vessel Leak-Off Line Isolation Valve	RCB	B	N/A	N/A	N/A	N/A	I	
RC-V0212	Reactor Vessel Vent Valve	RCB	B	N/A	N/A	N/A	N/A	I	
RC-V0240	PZR Spray Isolation Valve	RCB	B	N/A	N/A	N/A	N/A	I	
RC-V0241	PZR Spray Isolation Valve	RCB	B	N/A	N/A	N/A	N/A	I	
RC-V0442	PZR Spray Isolation Valve	RCB	B	N/A	N/A	N/A	N/A	I	
RC-V0443	PZR Spray Isolation Valve	RCB	B	N/A	N/A	N/A	N/A	I	
RC-V0430	RCP Bleed-Off Isolation Valve	RCB	B	N/A	N/A	N/A	N/A	I	
RC-V0431	RCP Bleed-Off Isolation Valve	RCB	B	N/A	N/A	N/A	N/A	I	
RC-V0432	RCP Bleed-Off Isolation Valve	RCB	B	N/A	N/A	N/A	N/A	I	
RC-V0433	RCP Bleed-Off Isolation Valve	RCB	B	N/A	N/A	N/A	N/A	I	
RC-V0244	PZR Spray Line Check Valve	RCB	A-1, A-2	N/A	N/A	N/A	N/A	I	
Various	Hydraulic Snubbers for SG	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I	(3)
Various	Hydraulic Snubbers for RCP	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I	(3)
Various	Hydraulic Snubbers for Surge Line	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I	(3)
Various	Reactor Coolant Loop Piping	RCB	N/A	N/A	N/A	N/A	N/A	I	
Various	Surge Line Piping	RCB	N/A	N/A	N/A	N/A	N/A	I	
Various	Surge Line Supports	RCB	N/A	N/A	N/A	N/A	N/A	I	
Various	Steam Generator Supports including Snubbers	RCB	N/A	N/A	N/A	N/A	N/A	I	
Various	Reactor Coolant Pump Supports including Snubbers	RCB	N/A	N/A	N/A	N/A	N/A	I	
Later	Steam Generator Assembly	RCB	N/A	N/A	N/A	N/A	N/A	I	
Later	Pressurizer Assembly	RCB	N/A	N/A	N/A	N/A	N/A	I	
Later	Reactor Vessel Assembly	RCB	N/A	N/A	N/A	N/A	N/A	I	
Various	Reactor Vessel Supports	RCB	N/A	N/A	N/A	N/A	N/A	I	
Later	RCP Oil Fill Line CIV, Gate Valve and Actuator	RCB	A-1, A-2	Short-Term	Harsh	Harsh	No	I	(3)
Later	RCP Oil Fill Line CIV, Gate Valve and Actuator	AB	D	Short-Term	Mild	Harsh	No	I	(3)
Service Air System									
SA-V0001	Cylinder Valve and Actuator, CIV	AB	D	Short-Term	Mild	Harsh	No	I	
S/G Blowdown System									
SD-V0005	S/G Blowdown Line CIV, Gate and Actuator	AB	D	Intermittent	Mild	Harsh	No	I	(3)
SD-V0006	S/G Blowdown Line CIV, Gate and Actuator	AB	D	Intermittent	Mild	Harsh	No	I	(3)

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Reactor Coolant Gas Vent System									
RG-V0410	Pressurizer Gas Vent Isolation Valve	RCB	A-2	Various	Harsh	Harsh	No	I	
RG-V0411	Pressurizer Gas Vent Isolation Valve	RCB	A-2	Various	Harsh	Harsh	No	I	
RG-V0412	Pressurizer Gas Vent Isolation Valve	RCB	A-2	Various	Harsh	Harsh	No	I	
RG-V0413	Pressurizer Gas Vent Isolation Valve	RCB	A-2	Various	Harsh	Harsh	No	I	
RG-V0414	Reactor Vessel Upper Head Gas Vent Isolation Valve	RCB	A-2	Various	Harsh	Harsh	No	I	
RG-V0415	Reactor Vessel Upper Head Gas Vent Isolation Valve	RCB	A-2	Various	Harsh	Harsh	No	I	
RG-V0416	Reactor Vessel Upper Head Gas Vent Isolation Valve	RCB	A-2	Various	Harsh	Harsh	No	I	
RG-V0417	Reactor Vessel Upper Head Gas Vent Isolation Valve	RCB	A-2	Various	Harsh	Harsh	No	I	
RG-V0419	Gas Vent to IRWST Valve	RCB	A-2	Various	Harsh	Harsh	No	I	
RG-V0420	Gas Vent to IRWST Valve	RCB	A-2	Various	Harsh	Harsh	No	I	
RG-V1421	RCGVS Vacuum Breaker Valve	RCB	A-2	N/A	Harsh	Harsh	No	I	

APR1400 DCD TIER 1

Table 2.4.5-2

Reactor Coolant Gas Vent System Component List

Component Name	Item No. ⁽¹⁾	ASME Section III Class	seismic Category	Class 1E/Harsh Envir. Qual.	Control/ Display at MCR	Control/ Display at RSR	Control Signal	Active Safety Function	Loss of Motive Power Position
Pressurizer Gas Vent Isolation Valves (SOV)	RG-V410, 411, 412, 413	1	I	Yes/Yes	Yes/Yes	Yes/Yes	-	Open/ Closed	Closed
Reactor Vessel Upper Head Gas Vent Isolation Valves (SOV)	RG-V414, 415 416, 417	1	I	Yes/Yes	Yes/Yes	Yes/Yes	-	Open/ Closed	Closed
Gas Vent to RDT Valves (SOV)	RG-V418	2	I	No/No	Yes/Yes	Yes/Yes	-	-	Closed
Gas Vent to IRWST Valves (SOV)	RG-V419, 420	2	I	Yes/Yes	Yes/Yes	Yes/Yes	-	Open	Closed
RCGVS Vacuum Breaker Valve	RG-V1421	3	I	No/No	-	-	-	-	-

(1) The column "Item No." is information only (not part of certified design).

Yes