
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.: 87-7993
SRP Section: 09.03.01 – Compressed Air System
Application Section: 09.03.01
Date of RAI Issue: 07/16/2015

Question No. 09.03.01-1

GDC 1 requires that safety-related SSCs be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions performed.

DCD Tier 2, Section 9.3.1 indicates that the compressed air system (CAS) is comprised of the service air system (SAS) and the instrument air system (IAS). The SAS connects with the IAS upstream of the instrument air dryers and filters in order to maintain acceptable air quality. The IAS provides compressed air required to actuate or control equipment that performs safety-related functions during normal operations, transients, or accidents. DCD Tier 2, Subsection 9.3.1.1 states that the compressed air system is designed to meet the requirements of ANSI/ISA 7.0.01-1996, "Quality Standard for Instrument Air." DCD Tier 2 Subsection 9.3.1.4 again references the same ISA standard to indicate how the IAS is to be analyzed for moisture, air, and particulate content.

For instrument air quality, SRP Section 9.3.1, Revision 3, endorses the use of ANSI/ISA S7.3 R1981, "Quality Standard for Instrument air." The staff notes that ANSI/ISA 7.0.01-1996 quality requirements are not consistent with the air quality requirements in the guidance identified in the current SRP 9.3.1. The 1996 guidance (proposed by the applicant) includes relaxation on the maximum allowed particulate size and the maximum pressure dew point.

The applicant is requested to justify crediting the ANSI/ISA 7.0.01-1996 quality requirements instead of the NRC endorsed guidance provided in ANSI/ISA-S7.3-R1981, or to update the DCD to reflect the staff's approved standard.

Response

The Preface to ANSI/ISA-7.0.01-1996 states as follows:

"This Standard, complete with all updates, incorporates the following previous SP7 Subcommittees and documents:

SP7.1	Pneumatic Control Circuit Pressure Test
SP7.3	Air Quality Standards for Pneumatic Instruments
SP7.3	Application and Tests for Quality Standards for Instrument Air
SP7.4	Air Pressures for Pneumatic Controllers and Transmission Systems
SP7.6	Pneumatic Control Circuit Transmission Distances
ISA-RP7.1-1956	Pneumatic Control Circuit Pressure Test
ISA-7.3-1975 (R1981)	Quality Standard for Instrument Air
ISA-7.4-1981	Air Pressures for Pneumatic Controllers, Transmitters and Transmission Systems
ISA-RP7.7-1984	Producing Quality Instrument Air”

Therefore, ANSI/ISA 7.0.01-1996 is the appropriate guidance for the air quality requirements.

Impact on DCD

There is no impact on the DCD.

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.

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RAI No.: 87-7993
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Application Section: 09.03.01
Date of RAI Issue: 07/16/2015

Question No. 09.03.01-3

GDC 1 requires that safety-related SSCs be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions performed.

DCD Tier 2, Figure on 9.3.1-1 indicates that the instrument air system (IAS) is used to provide air to components in possibly contaminated areas.

A review of the system P&ID (DCD Tier 2, Figure 9.3.1-1) shows insufficient detail to determine whether the compressed air system (CAS) could be contaminated through interfaces with radioactive systems or if there are provisions for detection of radioactivity and isolation of the system to prevent contamination or a release to the environment.

The staff requests the applicant to provide an evaluation of whether the compressed air system (both IAS and the service air system (SAS)) could become contaminated through interfaces with radioactive systems. If so, the applicant is requested to provide methods for detection, collection and control of system leakage to preclude contaminating other systems or releasing radioactive material to the environment.

Response

IAS and SAS are non-radioactive systems and do not contain contaminated fluid.

IAS supplies filtered, dry, and oil-free compressed air to air-operated valves, dampers, and pneumatic instruments and controllers. SAS supplies compressed air to pneumatic tools and for other services during plant normal operation and for maintenance during the plant shutdown.

Neither the IAS nor SAS has any direct contact with radioactive systems. Therefore, the compressed air system could not become contaminated through interfaces with radioactive systems.

Impact on DCD

There is no impact on the DCD.

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.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

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RAI No.: 87-7993
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Application Section: 09.03.01
Date of RAI Issue: 07/16/2015

Question No. 09.03.01-4

10 CFR 52.47(a)(2) requires that a standard design certification applicant provide a description and analysis of the structures, systems, and components (SSCs) of the facility, with emphasis upon performance requirements, the bases, with technical justification therefore, upon which these requirements have been established, and the evaluations required to show that safety functions will be accomplished.

The compressed air and gas systems are not classified as safety-related, except for the containment isolation function. The containment isolation valves are identified and discussed in DCD Tier 1 Table 2.11.3-1, "Containment Isolation System Components List;" DCD Tier 2 Table 3.9-4, "Seismic Category I Active Valves;" DCD Tier 2 Table 3.9-11, "Inservice Testing of Safety-Related Pumps and Valves;" and DCD Tier 2 Table 3.11-3, "Equipment Qualification Equipment List." The isolation valves for the instrumentation air system, the service air system, and the nitrogen system are identified in these three tables with different identification numbers. Also, DCD Tier 1 Table 2.11.3-1 identifies the environmental qualifications of the valves as "Harsh" and DCD Tier 2, Table 3.11-3, "Equipment Qualification Equipment List," identify the environmental qualifications of the valves as "Mild."

The applicant is requested to correct the inconsistency in the naming of the valve across the DCD, and to correct the inconsistency in the environmental qualification of the valves.

Response

The valve description in Table 2.11.3-1 is to describe the item no. of valve instead of valve no. And, the valve descriptions in Table 3.9-4 and Table 3.11-3 are to describe the valve nos and valve identification nos, respectively instead of item nos.

Item nos. IA-V020 and IA-V1601 listed in DCD Tier 1, Table 2.11.3-1 (9 of 23) are the same valves as valve nos. IA-0020 and IA-1601 listed in DCD Tier 2, Tables 3.9-4, 3.9-13, and 3.11-3.

The naming of valves for the nitrogen system and service air system (SAS) is the same as for the instrument air system (IAS) above.

DCD Tier 2, Table 3.9-4 (11 of 22) will be revised to add SA-001 and SA-1401 to maintain consistency across the DCD.

DCD Tier 1, Table 2.11.3-1 (9 of 23) and DCD Tier 2, Table 3.11-3 (19, 21, and 24 of 66) will be revised to correct the inconsistency in environmental qualification of the valves.

Impact on DCD

DCD Tier 1, Table 2.11.3-1 (9 of 23), DCD Tier 2, Table 3.9-4 (11 of 22), and Table 3.11-3 (19, 21, and 24 of 66) will be revised as indicated on the attachment 1.

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

The technical report will be revised as indicated on the attachment 2.

APR1400 DCD TIER 1

Table 2.11.3-1 (9 of 23)

Item No. ⁽¹⁾	Valve Type	Arrangement No. ⁽³⁾	Closure Time (sec)	Location Relative to Containment	ASME Section III Class	Seismic Category	Class 1E/ Harsh Envir.	Control/ Display at MCR	Control/ Display at RCR	Control Signal ⁽⁴⁾	Active Safety Function	Loss of Motive Power Position
Gaseous Radwaste System												
GW-V0001	MOV	30	15	Inside	2	I	Yes/Yes	Yes/Yes	Yes/Yes	CIAS	Close	As-is
GW-V0002	SOV	30	15	Outside	2	I	Yes/Yes	Yes/Yes	Yes/Yes	CIAS	Close	Close
Instrument Air System												
IA-V0020	AOV	28	15	Outside	2	I	Yes/Yes	Yes/Yes	Yes/Yes	CIAS	Close	Close
IA-V1601	Check	28	-	Inside	2	I	No/Yes	No/No	No/No	-	Close	-
In-Containment Water Storage System												
IW-V005	MOV	31	20	Outside	2	I	Yes/Yes	Yes/Yes	Yes/Yes	CIAS	Close	As-is
IW-V006	MOV	31	20	Outside	2	I	Yes/Yes	Yes/Yes	Yes/Yes	CIAS	Close	As-is
IW-V010	SOV	32	15	Outside	2	I	Yes/Yes	Yes/Yes	Yes/Yes	-	Normal Open/Close	Open
IW-V011	SOV	32	15	Outside	2	I	Yes/Yes	Yes/Yes	Yes/Yes	-	Normal Open/Close	Open
IW-V012	SOV	32	15	Outside	2	I	Yes/Yes	Yes/Yes	Yes/Yes	-	Normal Open/Close	Open
IW-V013	SOV	32	15	Outside	2	I	Yes/Yes	Yes/Yes	Yes/Yes	-	Normal Open/Close	Open
IW-V014	SOV	32	15	Outside	2	I	Yes/Yes	Yes/Yes	Yes/Yes	-	Normal Open/Close	Open

IA-V0020

APR1400 DCD TIER 2

Table 3.9-4 (11 of 22)

Valve No.	System Name (Safety Function) ⁽¹⁾⁽²⁾⁽³⁾	Valve Type	ASME Section III Class	Actuator Type
FW-0124	SG 2 economizer FW isolation (close)	Gate	2	Electro-hydraulic
FW-0131	SG 1 economizer FW isolation (close)	Gate	2	Electro-hydraulic
FW-0132	SG 1 economizer FW isolation (close)	Gate	2	Electro-hydraulic
FW-0133	SG 2 economizer FW isolation (close)	Gate	2	Electro-hydraulic
FW-0134	SG 2 economizer FW isolation (close)	Gate	2	Electro-hydraulic
FW-1039	SG 1 downcomer FW line (operate)	Check	2	None
FW-1040	SG 1 downcomer FW line (operate)	Check	2	None
FW-1046	SG 2 downcomer FW line (operate)	Check	2	None
FW-1047	SG 2 downcomer FW line (operate)	Check	2	None
FW-1035	SG 1 economizer FW line (operate)	Check	2	None
FW-1037	SG 1 economizer FW line (operate)	Check	2	None
FW-1042	SG 2 economizer FW line (operate)	Check	2	None
FW-1043	SG 2 economizer FW line (operate)	Check	2	None
FW-1044	SG 2 economizer FW line (operate)	Check	2	None
FW-0138	FW chemical injection valve	Globe	2	Pneumatic
FW-0139	FW chemical injection valve	Globe	2	Pneumatic
FW-1050	FW chemical injection check valve	Check	2	None
FW-1051	FW chemical injection check valve	Check	2	None
NT-0004	Nitrogen system containment isolation (close)	Globe	2	Pneumatic
NT-1016	Nitrogen system containment isolation (operate)	Check	2	None
IA-0020	Instrument air system containment isolation (close)	Globe	2	Pneumatic
IA-1601	Instrument air system containment isolation (operate)	Check	2	None
AF-1012A	AFW recirculation (operate)	Check	3	None
AF-1014A	AFW recirculation (operate)	Check	3	None
AF-1012B	AFW recirculation (operate)	Check	3	None
AF-1014B	AF recirculation (operate)	Check	3	None
AF-1003A	AF discharge (operate)	Check	3	None
SA-0001	Service air system containment isolation (close)	Globe	2	Pneumatic
SA-1401	Service air system containment isolation (operate)	Check	2	None

APR1400 DCD TIER 2

Table 3.11-3 (19 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⁾							
Containment Hydrogen Control System (Con't)									
HG-HR04A	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR04B	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR05A	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR05B	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR06A	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR06B	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR07A	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR07B	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR08A	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR08B	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR09A	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR09B	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR10A	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR10B	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR11A	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR11B	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR12A	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR12B	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR13A	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR13B	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR14A	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR14B	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR15A	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
HG-HR15B	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I		
Instrument Air System									
IA-V0020	Cylinder Valve and Actuator, CIV	AB	D	Short-Term	Mild	Harsh	No	I	(3)
In-Containment Water Storage System									
IW-ST01A	IRWST Sump Strainer	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I	
IW-ST01B	IRWST Sump Strainer	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I	
IW-ST01C	IRWST Sump Strainer	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I	
IW-ST01D	IRWST Sump Strainer	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I	

Harsh

APR1400 DCD TIER 2

Table 3.11-3 (21 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⁾						
Main Steam System									
MS-V1307	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	(3)
MS-V1308	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	(3)
MS-V1309	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	(3)
MS-V1310	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	(3)
MS-V1311	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	(3)
MS-V1312	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	(3)
MS-V1313	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	(3)
MS-V1314	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	(3)
MS-V1315	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	(3)
MS-V1316	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	(3)
MS-V1317	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	(3)
MS-V1318	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	(3)
MS-V1319	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	(3)
MS-V1320	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	(3)
Compressed Gas System									
NT-V0004	Nitrogen Supply to SITs and RDT CIV, Globe Valve and Actuator	AB	D	Short-Term	Mild	Harsh	No	I	

Harsh

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)

Harsh

Equipment Qualification Program

APR1400-E-X-NR-14001-P, Rev. 0

Table 3 (19 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⁾							
Containment Hydrogen Control System (cont.)									
HG-HR04A	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR04B	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR05A	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR05B	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR06A	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR06B	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR07A	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR07B	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR08A	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR08B	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR09A	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR09B	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR10A	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR10B	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR11A	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR11B	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR12A	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR12B	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR13A	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR13B	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR14A	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR14B	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR15A	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
HG-HR15B	Passive Autocatalytic Recombiner	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
Instrument Air System									
IA-V0020	Cylinder Valve and Actuator, CIV	AB	D	Short-Term	Mild	Harsh	No		⁽³⁾
In-Containment Water Storage System									
IW-ST01A	IRWST Sump Strainer	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
IW-ST01B	IRWST Sump Strainer	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
IW-ST01C	IRWST Sump Strainer	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		
IW-ST01D	IRWST Sump Strainer	RCB	A-1, A-2	Continuous	Harsh	Harsh	No		

Equipment Qualification Program

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Table 3 (21 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⁾						
Main Steam System									
MS-V1307	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	⁽³⁾
MS-V1308	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	⁽³⁾
MS-V1309	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	⁽³⁾
MS-V1310	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	⁽³⁾
MS-V1311	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	⁽³⁾
MS-V1312	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	⁽³⁾
MS-V1313	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	⁽³⁾
MS-V1314	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	⁽³⁾
MS-V1315	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	⁽³⁾
MS-V1316	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	⁽³⁾
MS-V1317	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	⁽³⁾
MS-V1318	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	⁽³⁾
MS-V1319	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	⁽³⁾
MS-V1320	Main Steam Safety Valve	AB	M	N/A(LOCA) Cont(MSLB)	Harsh	Harsh	No	I	⁽³⁾
Compressed Gas System									
NT-V0004	Nitrogen Supply to SITs and RDT CIV, Globe Valve and Actuator	AB	D	Short-Term	Mild	Harsh	No	I	

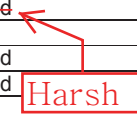
Harsh

Equipment Qualification Program

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Table 3 (25 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.)									
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⁾
Safety Injection System									
SI-PP02A	SI Pumps motors	AB	D	Continuous	Mild	Harsh	No	I	
SI-PP02B	SI Pumps motors	AB	D	Continuous	Mild	Harsh	No	I	
SI-PP02C	SI Pumps motors	AB	D	Continuous	Mild	Harsh	No	I	
SI-PP02D	SI Pumps motors	AB	D	Continuous	Mild	Harsh	No	I	
SI-TK-01D	Safety Injection Tank	RCB	A-1, A-2	N/A	Harsh	Harsh	No	I	
SI-TK-01A	Safety Injection Tank	RCB	A-1, A-2	N/A	Harsh	Harsh	No	I	
SI-TK-01B	Safety Injection Tank	RCB	A-1, A-2	N/A	Harsh	Harsh	No	I	
SI-TK-01C	Safety Injection Tank	RCB	A-1, A-2	N/A	Harsh	Harsh	No	I	
SI-TK-02A	Safety Injection Filling Tank	AB	D	N/A	Mild	Harsh	No	I	
SI-TK-02B	Safety Injection Filling Tank	AB	D	N/A	Mild	Harsh	No	I	
SI-V0100	Gate Valve, IRWST Return Line Check	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I	
SI-V0101	Gate Valve, IRWST Return Line Check	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I	
SI-V0102	Gate Valve, Test Connection Isolation	AB	D	Continuous	Mild	Harsh	No	I	
SI-V0103	Gate Valve, Test Connection Isolation	AB	D	Continuous	Mild	Harsh	No	I	
SI-V0112	Gate Valve, SIT Atmospheric Vent Isolation	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I	
SI-V0113	SI Line Check	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I	
SI-V0115	Globe Valve, Safety Injection Flow Indicator Root	AB	D	N/A	Mild	Harsh	No	I	
SI-V0125	Globe Valve, Safety Injection Flow Indicator Root	AB	D	N/A	Mild	Harsh	No	I	
SI-V0135	Globe Valve, Safety Injection Flow Indicator Root	AB	D	N/A	Mild	Harsh	No	I	
SI-V0145	Globe Valve, Safety Injection Flow Indicator Root	AB	D	N/A	Mild	Harsh	No	I	
SI-V0116	Globe Valve, Safety Injection Flow Indicator Root	AB	D	N/A	Mild	Harsh	No	I	
SI-V0126	Globe Valve, Safety Injection Flow Indicator Root	AB	D	N/A	Mild	Harsh	No	I	
SI-V0136	Globe Valve, Safety Injection Flow Indicator Root	AB	D	N/A	Mild	Harsh	No	I	
SI-V0146	Globe Valve, Safety Injection Flow Indicator Root	AB	D	N/A	Mild	Harsh	No	I	
SI-V0117	Globe Valve, SIT Pressure Indicator Root	RCB	A-1, A-2	N/A	Harsh	Harsh	No	I	
SI-V0127	Globe Valve, SIT Pressure Indicator Root	RCB	A-1, A-2	N/A	Harsh	Harsh	No	I	
SI-V0137	Globe Valve, SIT Pressure Indicator Root	RCB	A-1, A-2	N/A	Harsh	Harsh	No	I	
SI-V0147	Globe Valve, SIT Pressure Indicator Root	RCB	A-1, A-2	N/A	Harsh	Harsh	No	I	
SI-V0118	Gate Valve, SIT Atmospheric Vent Isolation	RCB	A-1, A-2	Continuous	Harsh	Harsh	No	I	
SI-V0119	Globe Valve, SIT Pressure Indicator Root	RCB	A-1, A-2	N/A	Harsh	Harsh	No	I	



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.: 87-7993
SRP Section: 09.03.01 – Compressed Air System
Application Section: 09.03.01
Date of RAI Issue: 07/16/2015

Question No. 09.03.01-5

GDC 2 requires that safety-related SSCs be designed to withstand the effects of natural phenomena, including earthquakes, without loss of capability to perform safety functions.

DCD Tier 2, Section 9.3.1.1 states that each safety-related valve is provided with an accumulator with two cycles of minimum capacity, if needed. The staff identified that the applicant has not identified which valves require accumulators to perform their intended safety function or the seismic design of the accumulator. The non-seismic compressed air system piping is routed in areas with safety-related components. During a seismic event, the non-seismic compressed air system piping could adversely affect Seismic Category I and II components that are located nearby.

It is not clear to the staff that the applicant has evaluated the impact of the failure of the non-seismic SSCs on the Seismic Category I SSCs.

The applicant is requested to include in the DCD an evaluation of the impact of the failure of the non-seismic SSCs on the safety-related SSCs, to identify the compressed air accumulators that supply air to the safety-related valves, and to provide the seismic design of these accumulators.

Response

DCD Subsection 9.3.1.3 states that “The compressed air and gas systems are non-safety-related systems with the exception of the containment isolation portion, which is described in Subsection 6.2.4. No safety evaluation is required.”

DCD Tier 2, Subsection 3.2.1, “Seismic Classification” states seismic Category II. Seismic Category II is classified that NNS SSCs that are not seismic Category I but whose failure by virtue of physical proximity to safety-related equipment or structures could prevent a component or structure from fulfilling its required function.

Seismic Category II NNS SSCs are designed to preclude a gross structural failure resulting from an SSE that could degrade the ability of adjacent safety-related SSCs to function to an acceptable level.

Therefore, NNS SSCs on the safety-related area which are located safety-related SSCs are designed as seismic Category II.

There are two auxiliary feedwater (AFW) pump turbine steam (TBN STM) supply valves in DCD Tier 2, Figure 10.3.2-1 (1 of 2). Each AFW pump TBN STM supply valve has a compressed air accumulator that is provided by the valve manufacturer. These valves and compressed air accumulators are designed as seismic Category I.

Impact on DCD

There is no impact on the DCD.

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.