

---

---

## 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: 9.3.1  
Date of RAI Issue: 07/16/2015

---

### **Question No. 09.03.01-2**

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.

Generic Issue 43 stresses the importance of procedures, training and testing related to loss of air system pressure.

DCD Tier 2, Section 14.2.7.2, "Preoperational Testing of Instrument and Control Air Systems," states that RG 1.68.3 is not applicable to APR 1400 because the safety-related air instruments are supplied by the high quality air of the instrument air system (IAS).

The staff noticed that DCD Tier 2, Section 9.3.1.1.b.2 states that the service air system (SAS) can supply backup air to the IAS; therefore, a low quality air system could provide air to safety-related air instruments. Additionally, the IAS and the SAS may be routed through the same areas. Instruments may be erroneously connected to the wrong system. The applicant has not proposed an ITAAC or a startup test to verify that the safety-related air instruments are connected to the correct air system.

The applicant is requested to propose a startup test for the CAS consistent with the guidance provided in RG 1.68.3.

### **Response**

Each train of the instrument air system (IAS) consists of an air compressor, an air receiver, one set of dryers, and a filtering unit. The IAS is configured with two independent 100% capacity trains. One train is normally in service while the other is in standby. The primary compressor runs cyclically to maintain a specified range of pressures downstream of the air receiver while the other compressor unit is in standby.

A separate service air (SA) compressor may supplement the supply of compressed air to the IAS as a backup in the event that both of the primary and standby IA compressors do not meet the system air demand. The service air backup supply line is connected to a cross-connect line between the air receiver and the filtering unit of the IAS, and the backup air flows to the set of dryers and the filtering unit and results in the same quality air. Also, an isolation valve and check valves are provided on the cross-connect line to permit the isolation of systems. Ingress of lower-quality air is therefore not possible. Consequently, Regulatory Position C.9 of RG 1.68.3 does not apply. Compressors of the IAS and the SAS are installed in the same area, but the route of each system is separated. Also, both IAS and SAS have respective plant labeling, so that each line will be identifiable.

In regard of Regulatory Position C.7 and C.8 of RG 1.68.3, individual safety-related components served by instrument air that must fail to a safe position will be tested as part of the testing for the individual safety-related systems.

APR1400 will comply with RG 1.68.3 except for Positions C.7, C.8 and C.9. Therefore, DCD Tier 2, 14.2.7.2 will be revised.

---

#### **Impact on DCD**

DCD Tier 2, 14.2.7.2 will be revised as indicated on 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 Environment Report.

**APR1400 DCD TIER 2**14.2.7.2 NRC Regulatory Guide 1.68.3, “Preoperational Testing of Instrument and Control Air Systems”

replace with "A" in next page

Regulatory Position C.9 of NRC RG 1.68.3 (Reference 5) requires that testing demonstrate that the plant equipment designated by design to be supplied by the instrument air system is not being supplied by other compressed air supplies (such as the service air system), which may have less restrictive air quality requirements. The APR1400 instrument air system is supplied for control and instrument facilities, and ingress of lower-quality air is therefore not possible. Consequently, Regulatory Position C.9 of NRC RG 1.68.3 does not apply.

14.2.7.3 NRC Regulatory Guide 1.79, “Preoperational Testing of Emergency Core Cooling Systems for Pressurized Water Reactors”

The intent of NRC RG 1.79 (Reference 6), Section C.1.c(2) is satisfied by opening the valves under maximum differential pressure (RCS at ambient pressure) using normal electrical power only. Conditions at the valve motor are independent of the power source for this test. The breaker response and the response of the valves to the “confirmatory open” signal are verified during the integrated safety injection actuation system test.

14.2.8 Use of Reactor Operating and Testing Experience in the Development of the Initial Test Program

The COL applicant has the benefit of experience acquired with the successful and safe startup of the reference plant, SKN #3, APR1400 PWR plant. The reactor operating and testing experience gained from the reference plant and other reactor types is factored into the design and test system information of plant equipment and systems that are demonstrated during the preoperational and startup test programs.

The COL applicant is to describe its program for reviewing available information on reactor operating and testing experiences and discusses how it used this information in developing the initial test program. The description is to include the sources and types of information reviewed, the conclusions or findings, and the effect of the review on the initial test program.

"A"

The APR 1400 will comply with NRC RG 1.68.3 except for C.7, C.8 and C.9 In regard of Regulatory Position C.7 and C.8 of RG 1.68.3, individual safety-related components served by instrument air that must fail to a safe position will be tested within the testing requirements for the individual safety-related systems.

The service air backup supply line is connected to a cross-connect line between the air receiver and the filtering unit for instrument air system, and the backup air flows to a set of dryers and a filtering unit and results in the same quality air. Also, an isolation valve and check valves are provided on the cross-connect line to permit isolation of the systems. Ingress of lower-quality air is therefore not possible. Consequently, Regulatory Position C.9 of NRC RG 1.68.3 does not apply.