

KHNPDCDRAIsPEm Resource

From: Ciocco, Jeff
Sent: Thursday, July 16, 2015 12:37 PM
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Cc: Hernandez, Raul; Dias, Antonio; Umana, Jessica; Lee, Samuel
Subject: APR1400 Design Certification Application RAI 87-7993 (09.03.01 - Compressed Air System)
Attachments: APR1400 DC RAI 87 SPSB 7993.pdf; image001.jpg

KHNP,

The attachment contains the subject request for additional information (RAI). This RAI was sent to you in draft form. Your licensing review schedule assumes technically correct and complete responses within 30 days of receipt of RAIs. However, KHNP requests, and we grant, 60 days to respond to the RAI question. We may adjust the schedule accordingly.

Please submit your RAI response to the NRC Document Control Desk.

Thank you,

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REQUEST FOR ADDITIONAL INFORMATION 87-7993

Issue Date: 07/16/2015
Application Title: APR1400 Design Certification Review – 52-046
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.
Docket No. 52-046
Review Section: 09.03.01 - Compressed Air System
Application Section: Section 9.3.1

QUESTIONS

09.03.01-1

RAI 9.3.1-1

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.

09.03.01-2

RAI 9.3.1-2

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.

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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.

09.03.01-3

RAI 9.3.1-3

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.

09.03.01-4

RAI 9.3.1-4

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

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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.

09.03.01-5

RAI 9.1.3-5

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 compress air accumulators that supply air to the safety-related valves, and to provide the seismic design of these accumulators.

