

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.: 130-8065
SRP Section: 16.01 - Technical Specifications
Application Section: 16.1.1
Date of RAI Issue: 08/06/2015

Question No. 16-26

Paragraph (a)(11) of 10 CFR 52.47 and paragraph (a)(30) of 10 CFR 52.79 states that a design certification (DC) applicant and a combined license (COL) applicant, respectively, are to propose TS prepared in accordance with 10 CFR 50.36 and 50.36a. 10 CFR 50.36 sets forth requirements for technical specifications to be included as part of the operating license for a nuclear power facility.

NUREG-1432, "Standard Technical Specifications (STS) Combustion Engineering Plants," Rev.4, provides NRC guidance on format and content of technical specifications as one acceptable means to meet 10 CFR 50.36 requirements.

SRP Section 16.0, Part III.2.A states, in part, "when reviewing a difference between the proposed TS provision and the reference TS provision, verify that the applicant's written technical or administrative reasoning in support of the difference is logical, complete, and clearly written."

Staff needs to evaluate all technical differences from standard TS (STS) NUREG-1432, which is referenced by the DC applicant in DCD Tier 2 Section 16.1, and the docketed rationale for each difference because conformance to STS provisions is used in the safety review as the initial point of guidance for evaluating the adequacy of the generic TS to ensure adequate protection of public health and safety, and the completeness and accuracy of the generic TS Bases.

The LCO selection criteria from 10 CFR 50.36(c)(2)(ii)(A) thru (D) have been proposed as a new defined term in generic TS Section 1.1. Regulatory requirements are not normally duplicated in the TS; it is unnecessary and avoids potential problems or additional work were the regulation to change. Also, the LCO selection criteria (as a defined term) are not specifically mentioned elsewhere in the generic TS and again are therefore unnecessary to have in TS; though the specific LCO selection criterion invoked for inclusion of each LCO is stated in the Applicable Safety Analyses discussion in the generic TS Bases. The applicant is

requested to justify adding the LCO selection criteria as a definition in generic TS Section 1.1, or remove it from DCD Tier 2 Chapter 16. (Staff noted that the Applicable Safety Analyses discussions in the proposed Bases for generic TS Sections 3.1 through 3.9 do not all use the proposed defined term, LCO SELECTION CRITERION 1, 2, 3, or 4.)

Response

To avoid potential problems or additional work were the regulation to change and for better consistency with NUREG-1432, the LCO selection criteria described in 16.1.1 will be deleted as shown in the attachment.

Impact on DCD

DCD Section 16.1.1 will be deleted as indicated in the attached markup.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

The LCO Selection Criteria will be deleted from the definition section of the Technical Specification as indicated in the attached markup.

Impact on Technical/Topical/Environmental Report

There is no impact on any Technical, Topical, or Environment Reports.

CHAPTER 16 – TECHNICAL SPECIFICATIONS

16.1 Introduction to Technical Specifications

~~16.1.1 Limiting Conditions for Operation (LCOs) Selection Criteria~~

~~The APR1400 Technical Specifications LCOs have included the structures, systems, components, and parameters which are identified by the LCO criteria of 10 CFR 50.36(e)(2)(ii) (Reference 1) as below:~~

- ~~a. Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.~~
- ~~b. A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.~~
- ~~c. A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.~~
- ~~d. A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.~~

16.1.1 ~~16.1.2~~ Technical Specification Content

The content of the APR1400 Technical Specifications meets the requirements of 10 CFR 50.36. The APR1400 Technical Specifications were developed using the most appropriate guidance, NUREG-1432 Rev. 4.0 (Reference 2).

The difference between NUREG-1432 and the APR1400 Technical Specification exists only as necessary to reflect advanced design features and operational features. The units specified in the APR1400 Technical Specifications are the International system of units (SI units) and the English units. The SI units have been used as the primary unit and the English units have been used in parentheses.

16.1.1.1 ~~16.1.2.1~~ Completion Times and Surveillance Frequencies

The Completion Times and Surveillance Frequencies specified in NUREG-1432 have generally applied to the associated Actions and Surveillance Requirements of the APR1400 Technical Specifications. For unique systems and features of the APR1400 design, similar Completion Times and Surveillance Frequencies have been adopted as appropriate.

16.1.1.2 ~~16.1.2.2~~ Plant Design Difference

There are some design differences between the APR1400 Technical Specifications and current design in NUREG-1432. Major design differences include the four train emergency core cooling system design, the adoption of POSRVs, the change of ventilation systems, and auxiliary feedwater system configuration.

16.1.1.3 ~~16.1.2.3~~ LCO and Bases information

Some LCOs of the APR1400 Technical Specifications have been added and changed compared to NUREG-1432, the related specifications are as below:

- a. Charging Flow (Specification 3.1.9)
- b. Special Test Exception (STE) – Reactivity Coefficient Testing (Specification 3.1.12)
- c. Boron Dilution Alarms (Specification 3.3.14)
- d. Reactor Coolant Gas Vent (RCGV) Function (Specification 3.4.16)
- e. Low Temperature Overpressure Protection (LTOP) System (Specification 3.4.11)
- f. RCS Specific Activity (Specification 3.4.15)

The Surveillance Frequency Control Program of the NUREG-1432 has not been applied to the APR1400 plants.

16.1.1.4 ~~16.1.2.4~~ Combined License Information

The intention of the APR1400 Technical Specifications is to be used as a guide for the development of the plant-specific Technical Specifications for plants which will reference the standard APR1400 plant. Single brackets ([]) are used to identify the preliminary design information or plant-specific information. Double brackets ([[]]) indicate the conceptual design information for those portions of the plant for which the application does not seek certification.

16.1.2 ~~16.1.3~~ Reference

1. 10 CFR 50.36, "Technical Specifications."
2. NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants," Rev. 4.0, April 2012.

1.1 Definitions

DOSE EQUIVALENT I-131

DOSE EQUIVALENT I-131 shall be that concentration of I-131 (Bq/g) that alone would produce the same dose when inhaled as the combined activities of iodine isotopes I-131, I-132, I-133, I-134, and I-135 actually present. The determination of DOSE EQUIVALENT I-131 shall be performed using thyroid dose conversion factors from Table 2.1 of EPA Federal Guidance Report No. 11, "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion," EPA-520/1-88-020, September 1988.

DOSE EQUIVALENT XE-133

DOSE EQUIVALENT XE-133 shall be that concentration of Xe-133 (Bq/g) that alone would produce the same acute dose to the whole body as the combined activities of noble gas nuclides Kr-85m, Kr-85, Kr-87, Kr-88, Xe-131m, Xe-133m, Xe-133, Xe-135m, Xe-135 and Xe-138 actually present. The determination of DOSE EQUIVALENT Xe-133 shall be performed using effective dose conversion factors for air submersion listed in Table III.1 of EPA Federal Guidance Report No. 12, "External Exposure to Radionuclides in Air, Water, and Soil," EPA 402-R-93-081, September 1993.

ENGINEERED SAFETY FEATURE (ESF) RESPONSE TIME

The ESF RESPONSE TIME shall be the time interval from when the monitored parameter exceeds its ESF actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (e.g., valves travel to their required positions, pump discharge pressures reach their required values). Times shall include emergency diesel generator starting and sequence loading delays, where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured.

~~LCO SELECTION CRITERIA~~

~~LCO (Limiting Conditions for Operation) is the lowest functional capability and performance level required for the safe operation of the nuclear facility. The selection criteria for LCO are classified as the following four categories per 10 CFR 50:~~

1.1 Definitions

~~LCO SELECTION CRITERIA (continued)~~

~~CRITERION 1~~

~~Installed instrument that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.~~

~~CRITERION 2~~

~~A process variable, design feature or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.~~

~~CRITERION 3~~

~~A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.~~

~~CRITERION 4~~

~~A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.~~

LEAKAGE

LEAKAGE shall be:

a. Identified LEAKAGE

1. LEAKAGE, such as that from pump seals or valve packing (except reactor coolant pump (RCP) seal water injection or leakoff), that is captured and transported to a collection system or a sump or collecting tank.
2. LEAKAGE into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of LEAKAGE detection systems or not to be pressure boundary LEAKAGE.

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Question No. 16-30

10 CFR 50.36 requires that each operating license issued by the Commission contain technical specifications (TS) that set forth the limits, operating conditions, and other requirements imposed upon facility operation for the protection of public health and safety. 10 CFR 52.47(a)(11) provides that a design certification (DC) applicant is to propose TS prepared in accordance with 10 CFR 50.36 and 50.36a.

Staff needs to evaluate all technical differences from standard TS (STS) c Combustion Engineering Plants, Rev. 4, which is referenced by the DC applicant in DCD Tier 2 Section 16.1, and the docketed rationale for each difference because conformance to STS provisions is used in the safety review as the initial point of guidance for evaluating the adequacy of the generic TS to ensure adequate protection of public health and safety, and the completeness and accuracy of the generic TS Bases.

On July 22, 1993, the NRC issued its Final Policy Statement (58 FR 39132) on Technical Specifications improvements, expressing the view that satisfying the guidance in the policy statement also satisfies Section 182a of the Atomic Energy Act and 10 CFR 50.36. In the final policy statement, the NRC stated its "intent that the wording and Bases of the improved STS be used in the Technical Specification related submittal to the extent practicable." Encouraging and maintaining standardization of TS requirements, such as contained in the STS, is therefore the policy of the NRC. In the final policy statement, the NRC encouraged "all licensees who submit Technical Specification related submittals based on this Policy Statement to emphasize human factors principles."

Content of the definition of OPERABLE - OPERABILITY does not fully conform to the STS definition. In keeping with NRC policy to maintain standardization of TS requirements, the applicant is requested to justify all deviations from the STS definition.

Response

The definition of OPERABLE - OPERABILITY for the APR1400 is different than that of NUREG-1432 STS, since the APR1400 Technical Specifications use the "division" concept. Further explanation of this will be provided along with justification of all of the deviations from the STS in a revised Technical Report (APR1400-K-O-NR-14001-NP, Rev. 1, Deviation Report between NUREG-1432 Rev. 4.0 and APR1400 Technical Specifications) to be submitted by October 2015.

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 Report

There is no impact on any Technical, Topical, or Environment Reports.