
REVISED 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.: 481-8546
SRP Section: 16 - Technical Specifications
Application Section: 16.3.4, 16.3.5, 16.3.6, 16.3.7, 16.3.9
Date of RAI Issue: 05/12/2016

Question No. 16-143

Paragraph (a)(11) of 10 CFR 52.47 and paragraph (a)(30) of 10 CFR 52.79 state 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-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. Staff needs to evaluate all technical differences from standard TS (STS) NUREG-1432, STS 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.

This request stems from discussion at the February 2016 meeting with the applicant.

In generic TS LCO 3.4.14, the applicant elects to include OPERABILITY of the containment atmosphere humidity monitor, which provides information about the containment atmosphere moisture content, and may "qualitatively" indicate the possibility of RCS LEAKAGE, in addition to the quantitative monitors for containment sump level and atmosphere particulate radioactivity. The gaseous radioactivity monitor specified in STS 3.4.15 is considered to be a qualitative RCS leakage monitor based on the guidance in Regulatory Guide (RG) 1.45, "Guidance on Monitoring and Responding to Reactor Coolant System Leakage," Revision 1.

The applicant is requested to address the following differences between the STS and the generic TS and Bases:

1. Condition A should say "Required containment sump (level) monitor inoperable" instead of "One or more required channel(s) inoperable"; Required Action A.2 should say

- “Restore required containment sump (level) monitor to OPERABLE status.” with a completion time of 30 days.
2. Condition B should say “Required containment atmosphere radioactivity (particulate) monitor inoperable.” Required Action B.2.1 should say “Restore required containment atmosphere radioactivity (particulate) monitor to OPERABLE status.” with a completion time of 30 days.
 3. Delete Required Action B.2.2, since it duplicates Required Action B.2.1, and an inoperable sump (level) monitor is the subject of Condition A (as pointed out in sub-question 1 above).
 4. Condition C should say “Required containment atmosphere humidity monitor inoperable.” Renumber Required Action C.2 as C.2.1, insert logical connector “AND” after Required Action C.2.1; and add Required Action C.2.2 which says “Restore required containment atmosphere humidity monitor to OPERABLE status.” with a completion time of 30 days.
 5. Delete Condition D Note, which says “Only applicable when the containment atmosphere gaseous radiation monitor is the only OPERABLE monitor.” The gaseous radiation monitor is not listed in the LCO 3.4.14 statement.
 6. Condition D should say “Required containment sump (level) monitor inoperable. AND Required containment atmosphere humidity monitor inoperable.” Revise Required Actions D.1 and D.2 to be similar to Required Actions E.1 and E.2 for Condition E, given that another quantitative monitor remains OPERABLE (that is, the containment atmosphere radioactivity (particulate) monitor).
 7. Add a new Condition F for “Required containment sump (level) monitor inoperable. AND Required containment atmosphere radioactivity (particulate) monitor inoperable.” With Required Actions and 7 day Completion Times similar to STS 3.4.15 Condition D for the situation where only a qualitative monitor remains OPERABLE (that is, the required containment atmosphere humidity monitor). Renumber Conditions F and G as Conditions G and H. Required Actions for new Condition F should say: “F.1 Restore required containment sump (level) monitor to OPERABLE status. | 7 days OR F.2 Restore required containment radioactivity (particulate) monitor to OPERABLE status. | 7 days”
 8. Revise the phrase “of the required containment ... monitor” in all SR statements. Add “(particulate)” after “radioactivity”, and “(level)” after “sump” in all locations in generic TS Subsection 3.4.14 and Bases Subsection B 3.4.14 when referring to the quantitative leakage monitors of the RCS leakage detection instrumentation required by LCO 3.4.14.
 9. Revise Subsection B 3.4.14 to reflect not only the above changes, but also the inclusion of the containment humidity monitor as an LCO required monitor.
 10. Generic TS SR 3.4.14.1 says, “Perform CHANNEL CHECK of required containment atmosphere radioactivity monitor.” If only one radioactivity particulate monitor channel is required, how is this surveillance accomplished?

11. Justify not providing an SR to perform a CHANNEL CHECK of the required containment atmosphere humidity monitor.

Response – (Rev.3)

Subquestions 1 through 9 and 11

Technical Specification 3.3.14 and Bases 3.3.14 will be revised to incorporate the comments.

Subquestion 10

The containment atmosphere radioactivity (particulate) is monitored by two independent monitors, RE-039A and RE-040B. The measuring range and sampling point of these two monitors are identical. When the CHANNEL CHECK of the RE-039A is performed, RE-040B continuously monitors the containment atmosphere particulate radioactivity. The particulate radioactivity of the containment atmosphere is monitored even when the CHANNEL CHECK of one monitor is being performed.

Surveillance of one radioactivity particulate monitor channel is performed by using a radioactive check source. The radioactive check source is generally built into the detector assembly and can be remotely activated by the operator. The radioactive check source is primarily used to check whether a particular radiation monitoring channel loop is live or functioning as described in the response to the RAI 368-8470, Question 14.03.08-14 subquestion 4.a. When a check source is exposed to the detector on demand, if upscale measurement is indicated, the channel is assessed with channel live status by pass/fail criteria. The criteria are qualitative assessment, by observation, of channel behavior during operation.

The attachment for RAI response will be revised according to additional NRC comments

The bases for the humidity monitoring will be revised to include the following:

Humidity monitor can detect the increased vapor content of the containment air and a sudden and significant increase of humidity level is indicative of reactor coolant leakage. Several factors such as containment temperature, containment air volume, leak location, etc., influence the humidity level. This makes the humidity measurement difficult to use in a quantitative evaluation of an indicated leakage rate, and thus its usefulness may be questionable. Therefore humidity monitoring that detects a sudden and significant increase of humidity level can be best suited to alert the operator about a potential reactor coolant leakage.

Impact on DCD

Same as changes described in Impact on Technical Specifications section.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

DCD Revision 1 incorporated changes to the following Subsections that were included in the initial response to this RAI.

Technical Specification 3.3.14 and Bases 3.3.14 will be revised as shown in the Attachment.

The following DCD Revision 1 Subsection will be revised as a result of this revised response.

Technical Specification Bases 3.3.14 will be revised as shown in the Attachment.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Report.

BASES

ACTIONS (continued)

F.1 and F.2

With the required containment sump (level) monitor and the containment atmosphere radioactivity (particulate) monitor inoperable, the only means of detecting leakage is the containment atmosphere humidity monitor. This condition is applicable when the only OPERABLE monitor is the containment atmosphere humidity monitor. This condition does not provide the required diverse means of leakage detection. The Required action is to restore either of the inoperable required monitors to OPERABLE status within 7 days to regain the intended leakage detection diversity. The 7 day Completion Time ensures that the plant will not be operated in a degraded configuration for a lengthy time period.

G.1 and G.2

If a Required Action of Condition A, B, C, D or E cannot be met, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

H.1

If all required monitors inoperable, no automatic means of monitoring leakage are available, and immediate plant shutdown in accordance with LCO 3.0.3 is required.

SURVEILLANCE
REQUIREMENTSSR 3.4.14.1

SR 3.4.14.1 requires the performance of a CHANNEL CHECK of the required containment atmosphere radioactivity (particulate) monitors. The check gives reasonable confidence that the channel is operating properly. The Frequency of 12 hours is based on instrument reliability and is reasonable for detecting off normal conditions.

Insert "A" on the
next page

SR 3.4.14.2

SR 3.4.14.2 requires the performance of a CHANNEL CHECK of the required containment atmosphere humidity monitors. The check gives reasonable confidence that the channel is operating properly. The Frequency of 12 hours is based on instrument reliability and is reasonable for detecting off normal conditions.

RAI 481-8546 - Question 16-143_Rev.3

A

If only one radioactivity particulate monitor channel is required, surveillance of one radioactivity particulate monitor channel is performed by using a radioactive check source. The radioactive check source is generally built into the detector assembly and can be remotely activated by the operator. The radioactive check source is primarily used to check whether a particular radiation monitoring channel loop is live or functioning. When a check source is exposed to the detector on demand, if upscale measurement is indicated, the channel is assessed with channel live status by pass/fail criteria. The criteria are qualitative assessment, by observation, of channel behavior during operation.