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.:	**189-8057**
SRP Section:	**16 – Technical Specifications**
Application Section:	**16.3.1 Reactivity Control Systems**
Date of RAI Issued:	**09/01/2015**

Question No. 16-60

Clarify the term k_{N-1} in Technical Specifications (TS) 3.1.1 and 3.1.2.

The LCO statement "b" for both 3.1.1 and 3.1.2 read "b. k_{N-1} shall be < 0.99." The term k_{N-1} is never previously defined. The term is then used again in CONDITION B for both 3.1.1 and 3.1.2.

Section 3.2.2.a of the Writer's Guide for Plant Specific Improved Technical Specifications states: "Upon the first reference in each Specification or Bases to a phrase for which an abbreviation is desired to be used (except as allowed in Writer's Guide Section 3.2.2.b below), use the full phrase followed by the acronym or initialism set off by parenthesis. Use the abbreviation alone on all subsequent references in that Specification or Bases." Section 3.2.2.b discusses commonly used and understood acronyms and initialisms, which "k_{N-1}" does not fall under.

This clarification is required to ensure the TS are complete and accurate and that the guidance contained in the Writer's Guide is followed.

Response – (Rev. 1)

Instead of listing k_{N-1} as a defined term in Section 1.1 of Technical Specifications, LCO 3.1.1 will be revised as shown in the attached markup.

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

The original response indicated future incorporation of Technical Specification changes. These proposed changes have already been incorporated into Revision 1 of the Technical Specifications. Therefore, elimination of incorporated changes from Revision 1 of the Technical Specifications are included in the Attachment as well as the insertion of requested information to the LCO Section.

Impact on Technical/Topical/Environmental Report

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

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 (i.e, the valves travel to their required positions, pump discharge pressures reach their required values, etc.). 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. In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC.
~~K_{N-1}~~	~~K_{N-1} is the K effective calculated by considering the actual CEA configuration and assuming that the fully or partially inserted full strength CEA of highest worth is fully withdrawn.~~

k effective assuming the inserted control element assembly (CEA) of the highest worth is fully withdrawn (k_{N-1})

3.1 REACTIVITY CONTROL

3.1.1 SHUTDOWN MARGIN (SDM)

LCO 3.1.1

a. SDM shall be within the limits specified in the CORE OPERATING LIMITS REPORT (COLR).

b. ~~k_{N-1}~~ shall be < 0.99.

CEAs

c. With reactor trip circuit breakers (RTCBs) closed: Reactor criticality shall not be achieved with shutdown group ~~control element assemblies (CEAs)~~ movement.

APPLICABILITY: MODES 3, 4 and 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limits.	A.1 Initiate boration to restore SDM to within limit.	15 minutes
B. k_{N-1} not within limit. OR Reactor criticality can be achieved by shutdown group CEA movement when RTCBs are closed.	B.1 Vary CEA position to restore within limit. AND B.2 Initiate boration to restore within limit.	15 minutes 15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.1.1	Verify SDM to be within the limits specified in the COLR.	24 hours
SR 3.1.1.2	Verify k_{N-1} < 0.99.	24 hours
SR 3.1.1.3	Verify criticality cannot be achieved with shutdown group CEA movement when RTCBs are closed.	24 hours