



Westinghouse Electric Company
Nuclear Power Plants
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355
USA

U.S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, D.C. 20555

Direct tel: 412-374-6206
Direct fax: 412-374-5005
e-mail: sisk1rb@westinghouse.com

Your ref: Docket No. 52-006
Our ref: DCP/NRC2365

January 28, 2009

Subject: AP1000 Responses to Requests for Additional Information (SRP 11)

Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 11. This RAI response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in this response is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application.

Enclosure 1 provides the response for the following RAI:

RAI-SRP11.1-CHPB-01

Questions or requests for additional information related to the content and preparation of this response should be directed to Westinghouse. Please send copies of such questions or requests to the prospective applicants for combined licenses referencing the AP1000 Design Certification. A representative for each applicant is included on the cc: list of this letter.

Very truly yours,

A handwritten signature in black ink, appearing to read 'D. Sisk' followed by a flourish.

Robert Sisk, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

/Enclosure

1. Response to Request for Additional Information on SRP Section 11

cc: D. Jaffe - U.S. NRC 1E
E. McKenna - U.S. NRC 1E
S. Sanders - U.S. NRC 1E
T. Spink - TVA 1E
P. Hastings - Duke Power 1E
R. Kitchen - Progress Energy 1E
A. Monroe - SCANA 1E
P. Jacobs - Florida Power & Light 1E
C. Pierce - Southern Company 1E
E. Schmiech - Westinghouse 1E
G. Zinke - NuStart/Entergy 1E
R. Grumbir - NuStart 1E
T. Ray - Westinghouse 1E

ENCLOSURE 1

Response to Request for Additional Information on SRP Section 11

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP11.1-CHPB-01

Revision: 0

Question:

What are the Tc-99 concentrations in the primary and secondary coolant under design basis and realistic conditions? Please add these concentrations to the appropriate tables in section 11.1 and provide the technical basis for these concentrations.

The lack of Tc-99 concentration data in the secondary coolant has caused a problem with the staff and applicants who are performing dose consequence analysis for the liquid radwaste system failures. Note that SRP section 2.4.13 states that this assessment must consider the "most adverse" contamination in groundwater. Tc-99 concentrations are needed to perform the liquid radioactive waste system failure analysis for groundwater specified in SRPs 11.2(BTP-11-6) and 2.4.13. Tc-99, which is produced in the reactor core in amounts several orders of magnitude greater than I-129, becomes an important contributor to dose from groundwater because of its long half life and low retardation in soil. Without the Tc-99 concentrations, the consequence analysis is incomplete because it's missing one of the major contributors to dose and the staff cannot determine whether the applicant met the design criteria. This change is necessary to provide adequate protection of the public health and safety under 10 CFR 52.63.

Westinghouse Response:

The projected concentrations of Tc-99 in the primary coolant are as follows:

- Design basis - $1.2\text{E-}6$ $\mu\text{Ci/g}$ ($4.5\text{E+}4$ Bq/g)
- Realistic value - $3.6\text{E-}8$ $\mu\text{Ci/g}$ ($1.3\text{E+}3$ Bq/g)

These values are maximum values over a fuel cycle.

The design basis values were determined in the same manner as for other nuclides listed in DCD Table 11.1-2; that is

1. The core activity inventories are calculated as a function of time by the ORIGEN computer code,
2. The core inventories are coupled with another computer code (FIPCO) that solves the differential equations associated with the production and removal of activity in the RCS, based on an assumed level of fuel defects (0.25 %). The results of the FIPCO code provide the activity concentrations in the primary coolant as a function of time and the maximum value over the fuel cycle is considered in defining the design basis value.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

The "realistic" values of reactor coolant concentrations of other isotopes listed in AP1000 DCD Table 11.1-8 were determined based on data provided in ANSI/ANS-N18.1-1984. However, Tc-99 is not addressed in this standard. Therefore, the realistic value of Tc-99 shown above was obtained by scaling the design basis Tc-99 values by the ratio of the Tc-99m results; i.e.

Realistic Tc-99 concentration =

$$\text{Design Basis Tc-99 concentration in RCS} \times \frac{\text{ANSI/ANS 18.1 Realistic Tc-99m}}{\text{DCD Design Basis Tc-99m}}$$

The RAI text refers to "secondary coolant," which we infer to mean liquid stored in the effluent holdup tanks (EHT) of the liquid radwaste system. For the purposes of tank rupture evaluation, the isotopic concentrations in the effluent holdup tanks were established at 101% of the realistic reactor coolant concentration. Thus:

$$\text{Realistic Tc-99 concentration in EHT} = 3.6\text{E-}8 \mu\text{Ci/g}$$

AP1000 has been certified without Tc-99. The impact of Tc-99 is not sufficient to justify a change to the certified design. The information provided in this response can be used to evaluate the Tc-99 impact. Westinghouse does not propose any modification to the certified design.

Design Control Document (DCD) Revision:

None

PRA Revision:

None

Technical Report (TR) Revision:

None