

# REQUEST FOR ADDITIONAL INFORMATION 420-3109 REVISION 1

7/6/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 15.00.03 - Design Basis Accidents Radiological Consequence Analyses for Advanced  
Light Water Reactors  
Application Section: 15.0.3

QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects)  
(CIB1)

15.00.03-31

## Background

In order to verify compliance with the guidelines of SRP 15.0.3 Acceptance Criterion 1 [based on 10 CFR Part 50.34(a)(1)], as it relates to evaluation and analysis of fission product releases, the pH of the containment sump water must be raised above 7.0 after a LOCA to prevent revolatilization of iodine. The staff requires additional information in order to complete its confirmatory calculation of the sump pH.

RAI 15.00.03-28 (Reference 1) requested that the applicant provide information on radiation dose rates in containment airspace during severe accidents. This radiation, due to release of fission products from the primary system, is absorbed by electrical cable jacketing and produces acids (primarily HCl and H<sub>2</sub>SO<sub>4</sub>) which can be released to the airspace and washed into containment pools and sumps. The cumulative effect of this action is to lower pH of water in which fission-product iodine is dissolved. If sufficient acids are produced, the pH could decrease below 7, at which point iodine is assumed to revolatilize and possibly be released from the containment.

The applicant's response (Reference 2) provided cumulative dose rates in containment at a number of time points through the accident. These doses included effects of both  $\gamma$  - and  $\beta$  - radiation combined. According to models used by the staff, the acid production rates from these two types of radiation are somewhat different. Hence, the staff is requesting that the applicant supply dose rates for  $\gamma$ - and  $\beta$ -radiation separately, so that a verifying calculation can be performed regarding acid production and the lowering of pH in containment water.

## Requested Information

Provide dose rates for  $\gamma$  - and  $\beta$  -radiation (separately) in the containment due to fission product decay during the course of a design-basis accident. These doses should be to the containment airspace, to be absorbed by electrical cable insulation and jacketing

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1. "Request for Additional Information No. 176-1987 Revision 1, SRP Section: 15.00.03 – Design Basis Accidents Radiological Consequence Analysis for Advanced Light Water Reactors, Application Section: Section 15.0.3" dated February 3, 2009. (ADAMS Accession No. ML0903603770)
2. Letter from Yoshiki Ogata, MHI, to NRC dated March 3, 2009; Docket No. 52-021 MHI Ref: UAP-HF-09068; Subject: MHI's Response to US-APWR DCD RAI No. 176-1987, Rev. 1 (ADAMS Accession No. ML090680229)