

REQUEST FOR ADDITIONAL INFORMATION 561-4441 REVISION 2

3/23/2010

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 12.02 - Radiation Sources

Application Section: 12.2

QUESTIONS for Health Physics Branch (CHPB)

12.02-31

The guidance contained in Regulatory Guide 1.206 section C.I.12.2.1 notes that the applicant is to provide the models, parameters and bases used to calculate source magnitudes, including isotopic composition and the bases for all values. RAI 141-1735 Question 12.02-6 noted that the data provided for the irradiated Incore detectors, and irradiated detector cables for the Incore Instrument System (ICIS) in Section 12.2 appeared to be insufficient to accurately describe the source term associated with these components. In their response dated February 6 2009, the applicant provided FSAR Table 12.2-71 "Parameters and Assumptions for Calculating Irradiated Incore Detector Drive Cable and Flux Thimble Source Strength" which listed the assumptions used for determining the fission chamber source term. This table did not contain sufficient information about the ICIC detectors.

RAI 427-2909 Question 12.02-17, a supplemental question to RAI 141-1735 Question 12.02-6, asked the applicant to describe the dose rates, and their bases, for the fission chambers of the In Core Instrument System (ICIS) neutron detectors. In their response dated 9/28/2009 the applicant noted that the source strengths of the ICIS detectors were calculated using the ORIGEN code. The parameters used to determine the source strengths were presented in RAI 427-2909 Question 12.02-17 Table 1. The applicant noted that the dose rates of the fission chamber, detector (Fe-Ni cover), and drive cable were calculated using the MicroShield code where the fission chamber and detector were modeled as point sources and the drive cable was modeled as a line source. However, the values of RAI 427-2909 Question 12.02-17 Table 1 "Parameters and Assumptions for Calculating Fission Chamber Source Strength" were not included in FSAR Tier 2 Revision 2 Table 12.2-71 "Parameters and Assumptions for Calculating Irradiated Incore Detector Drive Cable and Flux Thimble Source Strength", and it is not clear that the uranium content was part of the basis for the development of RAI 427-2909 Question 12.02-17 Figure 1 "Dose Rate Distribution of Fission Chamber, Detector and Drive Cable". In RAI 4019-15545 Question 12.02-23, the applicant was asked to add the additional information about the incore detectors presented in the response to RAI 427-2909 Question 12.02-17 to the FSAR, but it was not stated that the applicant should also include the fission products resulting from irradiation of the uranium in the detector fission chambers, as part of the analysis and isotopic results.

The applicant should also include the uranium content of the ICIS fission chamber detector in FSAR Table 12.2-71, and ensure that the dose response curves depicted in the response to RAI 427-2909 Question 12.02-17 Figure 1, reflects the uranium content

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of the ICIS detector fission chambers. Include this information in FSAR Section 12.2, as noted in RAI 4019-15545 Question 12.02-23.