

REQUEST FOR ADDITIONAL INFORMATION 744-5668 REVISION 2

4/27/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 19 - Probabilistic Risk Assessment and Severe Accident Evaluation
Application Section: 19.1

QUESTIONS for PRA and Severe Accidents Branch (SPRA)

19-502

(Follow-up to Question 19-459) The staff observes that the US-APWR internal fire and internal flooding risk assessments have been performed with conservative assumptions and thus removal of these conservatisms from the models could lower the estimated risks. However, it is not appropriate to conclude that removing the conservatisms would also lower the conditional containment failure probability (CCFP) accordingly as discussed in the response. A quantitative assessment of the CCFP may be necessary. For example, if the dominating scenario of switchyard fire as mentioned in the response is removed from the models due to its conservatism, the total fire CDF and LRF are appropriately reduced to $1.1E-6/\text{yr}$ and $1.73E-7/\text{yr}$ respectively. This yields a CCFP of 0.16, which is higher than the original estimate of 0.15.

The above consideration is also applicable to the internal flooding risk assessment. Removal of the most significant flood scenario of "Operator Failure to Open the Valve of the EFW Pit Discharge Cross-tie Line" mentioned in the response would not necessarily result in a reduction in CCFP.

Please justify the CCFP safety goal exceedance.

19-503

(Follow-up to Question 464) Generally, in performing fire risk assessment, the human error probabilities (HEPs) modeled in the internal events (IEs) PRA as provided in Table 23.3-2 "Human Actions Considered in the Internal Events PRA Model" of US-APWR PRA Chapter 23 must reflect equipment/indication losses, fire induced stress, communications difficulties, availability of lighting, potential impacts from smoke and heat, etc. Please describe the method used to examine and modify the IEs PRA HEPs to account for the potential impacts of fire events.

19-504

(Follow-up To Question 19-469) Part (3) of the response to Question 469 provides the flooding frequencies for EFWS, MFWS, CWS, and MSS. Please explain why these frequencies do not match the corresponding failure rates provided in Table 22.5-2 "Mean Pipe Failure Rates for US-APWR Internal Flood PRA" of the US-APWR PRA Chapter 22.

Part (5) of the response identifies the most significant human actions modeled in the flooding assessment. Clarify whether any human actions will be conducted outside the

REQUEST FOR ADDITIONAL INFORMATION 744-5668 REVISION 2

control room. If there are any, describe the potential impacts on these actions due to a postulated flooding event.

19-505

(Follow-up to Question 19-462) Please (a) describe in more detail and provide the failure probability of top event "EVA - Evacuation to RSP from MCR," (b) provide the accident frequencies of main control room sequences shown in Figure 1, and (c) explain why both success and failure paths of top event EVA are identical.