

REQUEST FOR ADDITIONAL INFORMATION 773-5646 REVISION 2

6/23/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

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

QUESTIONS for Fire Protection Team (SFPT)

19-532

Does the US-APWR design certification aircraft impact assessment take any exceptions to NEI 07-13 guidance or methodology? If so, the applicant must identify and provide brief justifications for those exceptions in the DCD. A detailed justification for each exception should be included in the applicant's AIA documentation. Also, in Section 19A.3, it is stated that methods described in NEI 07-13 were followed and a reference 19D-2 (should be reference 19A-2) is cited but not listed in Appendix 19A. Please provide the correct reference and clarify if assessment methodology different from the NEI 07-13, Rev. 7 has been used.

19-533

In DCD Section 19A.3, please identify all other buildings or structures, if any, which were analyzed in addition to the Pre-stressed Concrete Containment Vessel (PCCV) and Spent Fuel Pit (SFP) external walls. Also, correct typo (Reference 19D-2 should be 19A-2).

19-534

As stated in DCD Section 19A.2, perforation of the SFP is not predicted. However, the applicant did not address the potential for leakage through the SFP liner below the required minimum water level of the pool due to aircraft impact scenarios per NEI 07-13. Please provide information to address this issue in Appendix 19A.

19-535

In DCD Section 19A.4.3, the applicant credits the use of 3-hour fire barriers, including fire door and watertight fire doors for separating the safety divisions within the Reactor Building (R/B) and the east and west Power Source Buildings (PS/Bs). Please clarify that all intervening penetration seals and dampers also have 3-hour ratings. Please also clarify that all elements (i.e., wall, doors, dampers, penetration seals) of fire barriers that are key design features and are credited for the "one-barrier" option in NEI 07-13, have both a 3-hour fire rating and are able to withstand 5psid overpressure to prevent fire spread. The US-APWR DCD should identify and describe the specific fire barriers credited for the "one-barrier" option.

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19-536

The US-APWR DCD Appendix 19A submittal reviewed by the NRC should accurately reflect the results of the Aircraft Impact Assessment (AIA) performed by the applicant as required by 10 CFR 50.150. The submittal should include all key design features and functional capabilities credited in the AIA to meet the acceptance criteria. As such, the applicant is requested to verify that the submittal fully identified and described all key design features and functional capabilities credited in the AIA. The applicant must revise the submittal if it is found that there are key design features and functional capabilities credited in the AIA that are not identified or described in the US-APWR DCD Appendix 19A currently being reviewed by the NRC.

19-537

It is stated in Section 19A.1 of the U.S. APWR DCD, Revision 2 that the methodology used for assessing effects of aircraft impact is described in NEI 07-13, "Methodology for Performing Aircraft Impact Assessments for New Plant Designs," Revision 7 (NEI 07-13). NEI 07-13 describes the guidelines for assessing the effects of an aircraft impact that could occur while the plant is producing power. Contrary to the requirements of paragraph (b)(1) of 10 CFR 50.150, Section 19A.4 does not contain a description of design features nor functional capabilities relied upon to ensure that the assessment requirements in paragraph (a)(1) of 10 CFR 50.150 are met while the plant is producing power. Please modify Section 19A.4 to include a description of (1) design features and/or functional capabilities relied upon to ensure that the assessment requirements in paragraph (a)(1) of 10 CFR 50.150 are met while the plant is producing power, and (2) how these design features and/or functional capabilities meet the assessment requirements in paragraph (a)(1) of 10 CFR 50.150. Specifically, please describe how these key design features are capable of assuring core cooling following a beyond-design-basis aircraft impact event for a sufficient period of time to allow implementation of measures that will assure long term core cooling. The staff considers 24 hours to be a sufficient amount of time to implement mitigation measures for long-term core cooling. Please provide the staff with marked-up copy of Section 19A.4 that shows the required descriptions and include the descriptions in the next Revision of the DCD. If detailed descriptions of the subject design features are described in sections of the DCD other than 19A.4. Then, in section 19A.4, identify the features and the sections of the DCD containing the descriptions. Please, include descriptions of any success criteria in the U.S. APWR design PRA that are associated with the key design features.

19-538

It is stated in Section 19A.1 of the U.S. APWR DCD, Revision 2 that the methodology used for assessing effects of aircraft impact is described in NEI 07-13, "Methodology for Performing Aircraft Impact Assessments for New Plant Designs," Revision 7 (NEI 07-13). Tables 3-4 and 3-5 of NEI 07-13 describe the guidelines for assessing the effects of an aircraft impact that could occur while the plant is shutdown and the reactor is being cooled via the shutdown cooling system. Contrary to the requirements of paragraph (b)(1) of 10 CFR 50.150, Section 19F.4 does not contain a description of design features nor functional capabilities relied upon to ensure that the assessment requirements in

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paragraph (a)(1) of 10 CFR 50.150 are met while the plant is shutdown and the reactor is being cooled via the shutdown cooling system. Please modify Section 19A.4 to include a description of (1) design features and/or functional capabilities relied upon to ensure that the assessment requirements in paragraph (a)(1) of 10 CFR 50.150 are met while the plant is shutdown and the reactor is being cooled via the shutdown cooling system, and (2) how these design features and/or functional capabilities meet the assessment requirements in paragraph (a)(1) of 10 CFR 50.150. Specifically, please describe how these key design features are capable of assuring core cooling following a beyond-design-basis aircraft impact event for a sufficient period of time to allow implementation of measures that will assure long term core cooling. The staff considers 24 hours to be a sufficient amount of time to implement mitigation measures for long-term core cooling. Please provide the staff with marked-up copy of Section 19A.4 that shows the required descriptions and include the descriptions in the next Revision of the DCD. If detailed descriptions of the subject design features are described in sections of the DCD other than 19A.4. Then, in section 19A.4, identify the features and the sections of the DCD containing the descriptions. Please, include descriptions of any success criteria in the U.S. APWR design PRA that are associated with the key design features.

19-539

It is stated in Section 19A.1 of the U.S. APWR DCD, Revision 2 that the methodology used for assessing effects of aircraft impact is described in NEI 07-13, "Methodology for Performing Aircraft Impact Assessments for New Plant Designs," Revision 7 (NEI 07-13). Tables 3-4 and 3-5 of NEI 07-13 describe the guidelines for treating reactor scram in the assessment. In this regard, please describe those design features that assure the reactor will be shutdown following an aircraft impact, including any features that protect equipment in the Reactor Protection System.

Please provide the staff with marked-up copy of Section 19A.4 that shows the required descriptions and include the descriptions in the next Revision of the DCD. If detailed descriptions of the subject design features are described in sections of the DCD other than 19A.4. Then, in section 19A.4, identify the features and the sections of the DCD containing the descriptions. Please, include descriptions of any success criteria in the U.S. APWR design PRA that are associated with the key design features.

19-540

It is stated in section 19A.1 that key design features and functional capabilities necessary to maintain spent fuel pool cooling are described in Appendix 19A.4. Contrary to the requirements of paragraph (b)(1) of 10 CFR 50.150, in DCD Section 19A.4, such descriptions were not provided. Please modify Section 19A.4 to include descriptions of the key design features and functional capabilities being credited to maintain spent fuel pool cooling including design features that protect those SSCs credited for the removal of decay heat from the spent fuel pool.

Please provide the staff with marked-up copy of Section 19A.4 that shows the required descriptions and include the descriptions in the next Revision of the DCD. If detailed descriptions of the subject design features are described in sections of the DCD other than 19A.4. Then, in section 19A.4, identify the features and the sections of the DCD containing the descriptions. Please, include descriptions of any success criteria in the U.S. APWR design PRA that are associated with the key design features.

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19-541

In Revision 2 of DCD, Appendix 19A, “US-APWR Beyond Design Basis Aircraft Impact Assessment,” Section 19A.1, you refer to the NRC provided loading function of the impacting aircraft and list this as Reference 19A-1, and in Section 19A.4, you refer to Technical Report UAP-SGI-09001 and list this as Reference 3 in Section 19A.6. In accordance with the statements of consideration for the aircraft impact rule (74 FR 28120; June 12, 2009), the applicant is not required to submit the aircraft impact assessment—as opposed to the “description of the identified design features and functional capabilities” required by 10 CFR 50.150(b), to the NRC in its application. In addition, the NRC’s decision on an application subject to 10 CFR 50.150 will be separate from any NRC determination that may be made with respect to the adequacy of the impact assessment which the rule does not require be submitted to the NRC. Therefore, the NRC staff requests that (1) you remove the references to the subject NRC provided loading function of the impacting aircraft in Section 19A.1 and to topical report in Section 19A.4 and (2) remove items 1 and 3 from the References list in Section 19.A.6 of Appendix 19A of the DCD.

19-542

With regard to the integrity of the PCCV containment, Section 19A.2 concludes that perforation of the containment vessel is not predicted and in Section 19A.4.1, it is concluded that a strike upon the PCCV would not result in the penetration. Please clarify whether a potential strike on the PCCV will result in penetration of the containment and discuss if this has any effect on the identified key design features. Revise the DCD to ensure accurate and consistent conclusions regarding the response of the PCCV to a large, commercial aircraft impact.

19-543

In Section 19A.4.2, a description of key design features that limits the location and effects of potential aircraft strike on the R/B and the PS/B is provided. Provide the rationale for limiting potential aircraft strikes on the R/B and PS/B.

19-544

In Section 19A.4.2, the applicant has identified key design features for maintaining an intact containment but did not describe how the key design features show that the containment will remain intact. In accordance with the 10 CFR 50.150(b)(2), the applicant is required to provide a description of how the identified design features and functional capabilities meet the assessment requirements. Sufficiency criteria for the intact containment are provided in Section 2.5.1 of NEI 07-13, Rev. 7. The applicant is requested to provide a description how the identified key design features meet the rule requirement that, with reduced use of operator actions, the containment remains intact, i.e., perforation of concrete containment with steel liner does not occur on impact and that the containment ultimate pressure capability, given a core damage event, would not be exceeded before effective mitigation strategies can be implemented. Provide a

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description of (1) features that are relied upon to maintain the containment intact following a core damage event and (2) all equipment needed to maintain ultimate pressure capability until effective mitigation strategies can be implemented.

19-545

In Section 19A.4.2(6), the applicant identified 'design and location' of the spent fuel pool (SFP) and its supporting structures as key design features but did not provide description how the key design feature meet the rule requirement for maintaining an Spent fuel pool cooling or integrity. In accordance with the 10 CFR 50.150(b)(2), the applicant is required to provide a description of how the identified design features and functional capabilities meet the assessment requirements. Sufficiency criteria for the spent fuel pool integrity are provided in Section 2.5.2 of NEI 07-13, Rev. 7. The applicant is requested to provide a description how the identified key design features meet the spent fuel pool integrity sufficiency criteria.