

## REQUEST FOR ADDITIONAL INFORMATION 726-5640 REVISION 2

3/29/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 08.03.01 - AC Power Systems (Onsite)

Application Section: 8.3.1

QUESTIONS for Balance of Plant Branch 1 (SBPA)

08.03.01-40

(Editorial comment) Section E.1.2, Gas Turbine Generator (GTG), of the "Initial Type Test Result of Class 1E Gas Turbine Generator System" MUAP-10023-P(R1), contains the statement "None of the inherent operating principles are not significantly affected by ambient or component temperatures at the time of starting." This is a double negative, assumed to be an editorial error, and the word "not" should be deleted from this statement. The applicant should verify and revise the document accordingly.

08.03.01-41

In the "Initial Type Test Result of Class 1E Gas Turbine Generator System" MUAP-10023-P(R1), the staff accepts the conclusion of the applicant's evaluation and these test results that the GTG starting reliability is not significantly impacted by the ambient air temperature. However, some additional clarification of the evaluation presentation is needed as follows:

- a. The discussion in Table E.2.0-1 of the effect of ambient temperature on ignition (Ignition-Combustion Chamber discussion) states that at warm standby (equated to cold start) the impact on ignition is negligible because the combustion air entering the igniter is "slightly cooler," but then notes that "ignition performance is reduced" because the fuel/air mixture is "slightly harder to ignite." While the combustion air temperature may have been only slightly lower during the test sequence, the evaluation should address the impact on ignition performance at the design basis minimum site ambient temperature which will be considerably lower than the lowest ambient temperature experienced during the type tests.
- b. The "Basis Discussion" for the Ignition-Combustion Chamber evaluation states that "At ignition there is little difference in the fuel/air mixture temperature within the combustion chamber during starting." It is not clear what the "little difference" is referring to here and how this provides a basis for the conclusion of negligible impact. It is also not clear how the purging of air during the starting sequence supports the conclusion of negligible temperature effects.
- c. Similarly, the discussion on Ignition Performance-Combustor states "Since large volumes of air are drawn into the combustor at startup, at the time of ignition the ambient temperature is about the same between cold and hot

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start conditions.” The staff’s understanding of this statement is that for a specific ambient temperature (or limited range of temperatures), the large volume of intake air will not be significantly changed by contact with the machine. Therefore, it makes no difference whether the machine is hot or cold. However, this does not address the impact of design basis low ambient temperature on Ignition Performance as noted in Item a. above.