

REQUEST FOR ADDITIONAL INFORMATION 837-5945 REVISION 3

10/11/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 07.01 - Instrumentation and Controls - Introduction
Application Section: 07.01 - Instrumentation and Controls - Introduction

QUESTIONS for Instrumentation, Controls and Electrical Engineering 2 (ESBWR/ABWR Projects)
(ICE2)

07.01-44

GDC 22, "Protection system independence," requires in part that the protection system be designed to assure that the effects of natural phenomena and of normal operating, maintenance, and testing do not result in loss of protection function.

10 CFR 50.55a(h), "Protection and Safety Systems," requires compliance with IEEE Std. 603-1991, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations," and the correction sheet dated January 30, 1995. Particularly, Criterion 5.5, System Integrity, states "The safety systems shall be designed to accomplish their safety functions under the full range of applicable conditions enumerated in the design basis." IEEE Std 7-4.3.2-2003, Section 5.5.2, states "Test and calibration functions shall not adversely affect the ability of the computer to perform its safety function."

Branch Technical Position (BTP) 7-17 states, as part of the acceptance criteria for surveillance testing that, "The safety classification and quality of the hardware and software used to perform periodic testing should be equivalent to that of the tested system."

Several methods of software checks, which are of the same classification as the safety system as BTP 7-17 states, have been identified in the MELTAC safety system software. However the software to implement the memory integrity check (MIC) is not of the same safety classification nor has the efficiency of this check been identified versus that of the checks in the safety system software. It has not been identified if it checks for different types of errors and the reliability of those checks.

The staff requests MHI to identify the relative effectiveness of the checksum, the CRC and other safety system software checks versus that of the memory integrity check. Particularly, the amount of overlap in terms of types of software faults and the reliability of the memory integrity check. The staff requests MHI to address if there have been tests and analyses to determine the rate at which the memory integrity check will identify errors and if it can determine expected errors (changes) vs. unexpected errors.