
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

3/13/2024

**SAFETY SYSTEM DIGITAL PLATFORM
- MELTAC (MITSUBISHI ELECTRIC TOTAL ADVANCED CONTROLLER) -
TOPICAL REPORT**

Mitsubishi Electric Corporation

EPID: L-2023-TOP-0036
RAI NO.: RAI 2
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RAI 2

Regulatory Basis: 10 CFR 50.55a(h), "Protection and Safety Systems," requires that protection systems must be consistent with their licensing basis or may meet the requirements of the IEEE Std 603-1991, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations," and the correction sheet dated January 30, 1995. Clause 5.4, "Equipment Qualification" of IEEE Std 603-1991 states, in part, that safety system equipment shall be qualified by type test, previous operating experience, or analysis, or any combination of these three methods, to substantiate that it will be capable of meeting, on a continuing basis, the performance requirements as specified in the design basis. MELTAC is a safety system digital platform which shall meet the requirements in the above Clause 5.4.

Background and Issue: Plant Specific Action Item (PSAI) 5.2.4 of the safety evaluation (SE) for the original MELTAC TR requires the licensees to demonstrate that the generically qualified MELTAC platform equipment envelops the site conditions. However, Page 5 of the MELTAC TR states, in part, that "there is no additional site-specific EMI [electromagnetic interference] qualification."

Request: Please provide a statement justifying, clarifying, or explaining this statement in the revised MELTAC TR, since the EMI qualification testing for the MELTAC updated and new modules will not be performed until 2025 or later.

ANSWER:

MELCO agreed there is inconsistency between PSAI 5.2.4 and the existing statement of Section 3.0 in MELTAC Topical Report (JEXU-1041-1008). MELCO will revise MELTAC Topical Report (JEXU-1041-1008) in favor of PSAI 5.2.4.

Impact on Topical Report and/or Support Documents.

MELCO will revise Section 3.0 of MELTAC Topical Report (JEXU-1041-1008) to resolve inconsistency, as shown in Attachment-1.

There are no impacts on support documents.

The Equipment is designated Seismic Category I.

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5. RG 1.53 Application of the Single-Failure Criterion to Safety Systems (Rev. 2, November 2003)
 endorses IEEE Std. 379-2000
 See conformance to GDC 21 and 24. This Equipment can be configured at the application level so that safety functions are designed with N or N+1 divisions. Each safety division can be independent from the other safety divisions and from non-safety divisions. Independence ensures that credible single failures cannot propagate between divisions within the system and therefore cannot prevent proper protective action at the system level. Single failures considered in the divisions are described in the Failure Mode and Effect Analysis (FMEA) for each system. The FMEA method for the components of this Equipment is provided in this Topical Report. The MELTAC module level FMEA report is incorporated by reference. The module level FMEA provides input to the system level FMEA for each application. The system level FMEA is described in Application Licensing Documentation.
6. RG 1.75 Criteria for Independence of Electrical Safety Systems (Rev. 3, February 2005)
 endorses IEEE Std. 384-1992
 The MELTAC platform contains features to ensure that redundant safety divisions are physically and electrically independent of each other and physically and electrically independent of any non-safety divisions. Physical independence is maintained either by the required distance or by barriers which prevent propagation of fire or electrical faults. Electrical independence is maintained by fiber optic cable communication interfaces or conventional isolators, such as opto-couplers, relays or transformers. Conventional isolators include fault interrupting devices such as fuses or circuit breakers. Fiber optic cable communication interfaces are described in Section 4.3.2 (Control Network), 4.3.3 (Data Link) and 4.3.4 (Maintenance Network). Specifications and qualification of conventional isolators are discussed in Section 4.1.2 and 5.5 of this Topical Report, respectively.
7. RG 1.89 Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants (Rev. ~~124, June April June 1984 2023~~ 1984)
 endorses ~~IEEE Std. 323-1974 IEC/IEEE Std. 60780-323-2016~~ IEEE Std. 323-1974
 The environmental qualification of ~~this~~ Equipment listed in Table F-1 is by an appropriate combination of type testing and analysis. ~~This~~ Equipment listed in Table F-1 is qualified for use in a mild environment that is not adversely affected by plant accidents. Qualification for temperature and humidity is by type test. The generic MELTAC temperature and humidity qualification is demonstrated to envelope actual plant conditions by analysis of room ambient conditions and heat rise calculations for the installed configuration. Seismic qualification is by type testing. The generic MELTAC seismic qualification is demonstrated to envelope actual plant conditions by analysis of floor response spectrum at the installed location. Electromagnetic Interference (EMI)

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	<p>qualification is by type testing. MELTAC is generically qualified to the EMI envelope and acceptance criteria that are identified by regulatory guidance as enveloping US nuclear plant installations; therefore there is no additional site specific EMI qualification.</p>	RAI 2
	<p>This Equipment <u>listed in Table F-1</u> has no known aging mechanisms, except as noted in Section 7.4 and accommodated by periodic replacement; random failures will be detected through self-diagnoses and periodic surveillance testing. Type testing for conformance to RG 1.89 <u>Rev.1</u> is described through the aggregate of all qualification reports – Environmental, Seismic and Electromagnetic Compatibility (EMC), see Section <u>5.0 and 5.1 through Section 5.5</u>.</p>	RAI 1, 4
7-0	<p><u>RG 1.89 Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants (Rev. 2, April 2023)</u> <u>endorses IEC/IEEE Std. 60780-323-2016</u> <u>Equipment listed in Table F-2 is designed for use in a mild environment. It is planned to be qualified by an appropriate combination of type testing and analysis.</u> <u>Type testing for conformance to RG 1.89 Rev.2 is described through the aggregate of all qualification reports - Environmental, Seismic and Electromagnetic Compatibility (EMC), see Section 5.0 and 5.6 through Section 5.10.</u></p>	RAI 1, 4
7-1	<p><u>RG1.97 Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants (Rev.5, May 2019)</u> <u>endorses IEEE Std. 497-2016</u> <u>As described in conformance to GDC 13, the MELTAC platform contains features to monitor Type A, Type B and Type C variables for accident conditions in nuclear power plants.</u></p>	
8.	<p>RG 1.100 Seismic Qualification of Electric and Mechanical Equipment for Nuclear Power Plants (Rev. 343, September<u>May</u> September 2009<u>2009</u>) endorses IEEE 344-2013, IEEE Std C37.98-2013, ASME QME-1-2017 This Equipment is designated Seismic Category I. It is designed and qualified to withstand the cumulative effects of a minimum of 5 Operating Basis Earthquakes (OBEs) and one Safe Shutdown Earthquake (SSE) without loss of safety function or physical integrity. The input spectrum is selected to envelope all anticipated applications. Conformance to this envelope for specific applications is discussed in Application Licensing Documentation.</p>	RAI 1, 4
8-1	<p><u>RG 1.100 Seismic Qualification of Electric and Mechanical Equipment for Nuclear Power Plants (Rev. 4, May 2020)</u> <u>endorses IEEE 344-2013, IEEE Std C37.98-2013, ASME QME-1-2017</u> <u>This Equipment is designated Seismic Category I. It is designed to withstand the cumulative effects of a minimum of 5 Operating Basis Earthquakes (OBEs) and one Safe Shutdown Earthquake (SSE) without loss of safety function or physical integrity. The input spectrum is selected to envelope all anticipated</u></p>	RAI 1, 4