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Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Mr. Jeffrey A. Ciocco,

Project No.0751
MHI Ref: UAP-HF-08034

Subject:

REVIEW OF TOPICAL REPORTS RELATED TO THE US-APWR
DIGITAL INSTRUMENTATION AND CONTROLS: MUAP-07005-P,
"SAFETY SYSTEM DIGITAL PLATFORM-MELTAC," AND MUAP-07004-
P, "SAFETY INSTRUMENTATION AND CONTROLS SYSTEM
DESCRIPTION AND DESIGN PROCESS

Reference:

(1) Letter dated December 18, 2007, Stephanie M. Coffin to Keith
Paulson, same subject
(2) US-APWR Software Program Manual MUAP-07017(R0)
(3) Mitsubishi Heavy Industries, Ltd. Application for Design Certification of
the US-APWR Standard Plant Design UAP-HF-07170

This letter provides MHI's response to the Reference (1) letter, which requests additional
information pertaining to the software life-cycle processes of the MELTAC digital
platform and the digital safety systems which will employ that platform.

The US-APWR Software Program Manual (SPM), Reference 2, was submitted as part of
the US-APWR Design Certification Application submittal, Reference 3. The US-APWR
SPM directly addresses the software life-cycle for the safety systems application
software of the US-APWR. Enclosure 1 correlates the content of the Software Program
Manual to the specific NRC additional information request, Reference 1. Enclosure 1
also addresses other aspects of the additional information request, which pertain to the
MELTAC basic software; these are not addressed directly by the US-APWR SPM. The
US-APWR SPM and Enclosure 1 supplement the software life-cycle information
previously submitted in Section 6 of the two Topical Reports, MUAP-07004-P and
MUAP-07005-P, referenced in the NRC's December 18, 2007 letter.

It should be noted that the application software life-cycle process described in the US-
APWR SPM is also applicable to digital upgrades for operating plants. Because this
document has generic applicability to all MHI safety systems, MHI plans to revise this
document to clearly indicate its generic applicability. The revised document will be

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referenced in the Topical Report MUAP-07004-P (which will be referenced by operating plants that utilize the MELTAC Digital Platform as part of their licensing basis) and in the DCD. This revision will be submitted by March 31, 2008.

Section 6 of MUAP-07005-P describes the software life cycle process for the basic software of the MELTAC platform. Enclosure 1 correlates the various subsections of Section 6 of MUAP-07005-P with the life cycle guidance of BTP 7-14 and, as correlated, reflects that Section 6 of MUAP-07005-P provides the information sought by BTP-7-14. Section 6 of MUAP-07005-P is intended to provide a programmatic description of the MELTAC quality assurance plan and program for the software life cycle process for the basic software of the MELTAC platform. It describes the key contents of the "Safety System Platform Quality Assurance Program" Q-4102, referenced within MUAP-07005-P, which is the internal quality assurance manual directly used by MELCO personnel to implement its quality assurance program for the basic software of the MELTAC platform. As such, Q-4102 and the subordinate procedures it invokes are written in Japanese.

While the current Topical Reports address compliance to BTP 7-14, the US-APWR SPM and Enclosure 1 are provided to address the additional level of detail requested by the Staff. However, MHI notes that the timing and level of detail regarding software licensing submittals for digital systems is a key issue currently being addressed by the Digital I&C Task Working Group (TWG) 6. MHI sees the Staff's request for additional detail regarding conformance to BTP 7-14 as being tightly coupled to the work of this TWG. MHI participates actively in TWG 6 and in all digital I&C TWGs. MHI is fully committed to support TWG 6 and conform to any additional information submittals, or process changes, that may be needed to comply with the generic resolution of this issue.

The software life-cycle information currently contained in the subject Topical Reports, together with the additional information provided by the US-APWR SPM and Enclosure 1, conform with BTP 7-14 and are consistent with the level of detail proposed by industry representatives to TWG 6. However, to expedite NRC acceptance of the Topical Reports and to expedite the Staff's audit of the software life cycle program, MHI will provide for the Staff's information, but not officially on the docket, a translated version of Q-4102 by March 31, 2008. This will enable the Staff to review and verify the adequacy of the programmatic description of MELTAC's quality assurance program for the basic software of the MELTAC platform in Section 6 of MUAP-07005-P.

Consistent with other industry representatives, MHI is reluctant to docket internal generic documents, such as quality assurance manuals and procedures as represented by Q-4102, because these documents undergo periodic revisions, and there is currently no mechanism for a vendor to make those revisions without additional Staff review. However, MHI is fully committed to formally docket all information needed by the Staff to make its safety determination. Should the Staff determine after its review of Q-4102 that additional information is required to be docketed to support its safety determination, MHI will include that information in a revision to MUAP-07005-P or otherwise provide the information separately on the docket. Additionally, should TWG 6 conclude that internal documents, such as Q-4102, should be docketed, MHI will resubmit Q-4102 as docketed material.

Conformance to the software life-cycle guidance of BTP 7-14 is just one of numerous important issues which are described in the current Topical Reports. In aggregate, these Topical Reports demonstrate conformance to the many Sections and Branch Technical

Positions for Chapter 7 of the Standard Review Plan. These Topical Reports address each of these issues to a level of detail that is consistent with historical industry practice.

As stated in your letter, the subject Topical Reports were submitted to the NRC March 7, 2007. This first request for additional information was received by MHI more than 9 months later. We sincerely hope that the NRC will not continue to delay the acceptance of these Topical Reports based on a single difficult unresolved issue (i.e. level of detail), which the industry and NRC have been challenged to jointly resolve through TWG 6 and that the Staff will promptly begin its review of the Reports.

Sincerely,

M. Kaneda

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Enclosures:
Enclosure1 - Response to Information Requests

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<u>Contact Information</u>
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Enclosure 1 - Response to Information Requests

NRC Request

1. Software Life Cycle Process Planning

MHI is requested to submit the following documents to the NRC Staff:

- Software Management Plan (SMP)
- Software Development Plan (SDP)
- Software Quality Assurance Plan (SQAP)
- Software Integration Plan (SIntP)
- Software Installation Plan (SInstP)
- Software Maintenance Plan (SMaintP)
- Software Training Plan (STrngP)
- Software Operations Plan (SOP)
- Software Safety Plan (SSP)
- Software Verification and Validation Plan (SVVP)
- Software Configuration Management Plan (SCMP)
- Software Test Plan (STP)

2. Software Life Cycle Process Implementation

MHI is requested to submit the following documents to the NRC Staff:

- Safety analyses
- Verification and validation analysis and test reports
- Configuration management reports
- Testing Activities

One or more sets of these reports should be available for each of the following activity groups:

- Requirements
- Design
- Implementation
- Integration
- Validation
- Installation
- Operations and maintenance

System requirements and a Requirements Traceability Matrix should also be examined to provide context for the review.

MHI Response:

MHI's responses, below, are divided to distinctly address the Application Software that is plant specific and the Basic Software of the MELTAC platform that is generically applicable to all plants.

Application Software

Section 6 of MUAP-07004 describes the entire Safety System Design Process. Sections 6.2 and 6.3 focus on the Software Life Cycle Process for the Application Software. These sections summarize each of the plans described in the guidelines of BTP 7-14 and requested by the Staff, including organization responsibilities, design processes and controls, and implementation outputs.

The Software Program Manual, MUAP-07017, includes each of the Software Life Cycle Plans requested above for the safety system Application Software, as follows:

Plan proposed by BTP 7-14	Section in SPM
Software Management Plan (SMP)	3.1
Software Development Plan (SDP)	3.2
Software Quality Assurance Plan (SQAP)	3.3
Software Integration Plan (SIntP)	3.4
Software Installation Plan (SInstP)	3.5
Software Maintenance Plan (SMaintP)	3.6
Software Training Plan (STrngP)	3.7
Software Operations Plan (SOP)	3.8
Software Safety Plan (SSP)	3.9
Software Verification and Validation Plan (SVVP)	3.10
Software Configuration Management Plan (SCMP)	3.11
Software Test Plan (STP)	3.12

It is noted that the V&V plan (SVVP) includes development and maintenance of a Requirements Traceability Matrix. Also, many of the activities within these plans encompass both application software and the basic software of the MELTAC platform, since the life cycle activities are conducted after all system components (application software, basic software and hardware) are integrated together.

The implementation documents requested by the NRC are project specific. These documents are required by the Software Program Manual, MUAP-07017, but will not be available until a specific project commits to implement an MHI digital safety system. For

plant upgrades, these documents will be addressed in the License Amendment Request. For the US-APWR, these documents are addressed in the ITAAC.

MELTAC Basic Software
Section 6 of MUAP-07005-P describes the Life Cycle Process for the generic hardware and software of the MELTAC digital platform. As described, the Life Cycle is governed by the Safety System Platform Quality Assurance Program" Q-4102. The plans, processes, procedures, documentation and implementation reports invoked by Q-4102 are described in the following subsections of Section 6 of MUAP-7005-P:

- Quality Assurance (6.1.2)
- Management (6.1.3)
- Development (6.1.4) – includes Verification, and Validation, including unit testing and integration testing)
- Configuration Management (6.1.5)
- Cyber Security Management (6.1.6)
- Installation (6.1.8)
- Maintenance (6.1.9)
- Training (6.1.10)
- Operation (6.1.11)
- Software Safety Plan (6.1.12)

The plans, processes, procedures, documentation and implementation reports described in these sections encompass all of the software life cycle activities described in the guidelines of BTP 7-14 and as requested by the Staff. As such, Section 6 of MUAP-07005-P provides a programmatic description of the MELTAC quality assurance plan and program for the software life cycle process for the basic software of the MELTAC platform equivalent to that provided by MUAP-07017 for the application software.

Much of the basic MELTAC software, that has been in operation in nuclear plants for more than 20 years in Japan and will now be used in the US, was developed in accordance with Japanese Standard JEAG4101 and International Standard ISO9001. To ensure that the original software development process complied with the development life cycle guidance of BTP 7-14, MELCO conducted an assessment against the development requirements of Q-4102. This assessment is referred to as the US Conformance Program (UCP).

The UCP assessments for each development related software life cycle activity are described within Sections 6.1.2 through 6.1.6 of MUAP-07005-P. These sections describe the activities as well as the documentation and implementation reports generated for each activity. In addition, Section 6.1.7 describes additional quality activities that were conducted to compensate for the few deficiencies found in the original development program. These additional quality activities included documentation and code verification, unit testing, and creation and updating of a Requirements Traceability Matrix.

The additional quality activities of the UCP were conducted by MELCO's independent V&V team, and under MELCO's nuclear quality program, which has been assessed against 10CFR50 Appendix B (see Section 6.1.2). While the UCP may be viewed as a

commercial dedication program, MELCO now maintains and supports the MELTAC platform as an Appendix B supplier.

As stated in Section 6.1.7 of MUAP-07005-P, the UCP documentation is written in Japanese. MHI encourages the NRC Staff to visit the MELCO facility in Japan, and is eager to support mutually suitable audit arrangements, including translators.