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February 15, 2013

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

Attention: Mr. Jeffrey A. Ciocco

Docket No. 52-021
MHI Ref: UAP-HF- 13028

Subject: **MHI's Amended Response to US-APWR DCD RAI No. 880-6142 Revision 0 (SRP 03.11)**

Reference: 1) "Request for Additional Information No. 880-6142 Revision 0, SRP Section 03.11 – Environmental Qualification of Mechanical and Electrical Equipment - Application Section: 3.11", dated December 21, 2011.
2) "MHI's Response to US-APWR DCD RAI No. 880-6142 Revision 0 (SRP 03.11)," UAP-HF-12075, dated March 23, 2012

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Amended Response to Request for Additional Information No. 880-6142 Revision 0."

Enclosed is the amended response to a question contained within Reference 1.
This amendment is intended to incorporate the discussion with the NRC Staff during the conference call held on November 20, 2012.

Please contact Mr. Joseph Tapia, General Manager of Licensing Department, Mitsubishi Nuclear Energy Systems, Inc. if the NRC has questions concerning any aspect of this submittal. His contact information is provided below.

Sincerely,

Yoshiki Ogata,
Director- APWR Promoting Department
Mitsubishi Heavy Industries, LTD.

Enclosure:

1. Amended Response to Request for Additional Information No. 880-6142 Revision 0

DO81
NRO

CC: J. A. Ciocco
J. Tapia

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Enclosure 1

UAP-HF- 13028
Docket No. 52-021

Amended Response to Request for Additional Information
No. 880-6142 Revision 0

February 2013

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

02/15/2013

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 880-6142 REVISION 0**
SRP SECTION:	**03.11 – Environmental Qualification of Mechanical and Electrical Equipment**
APPLICATION SECTION:	**3.11**
DATE OF RAI ISSUE:	**12/21/2012**

QUESTION NO. RAI 03.11-42:

Identify the information that will be contained in the environmental qualification (EQ) data package reports. 10 CFR 50.49(j) requires that a record of EQ qualification documentation be maintained in an auditable form for the entire period while the equipment is installed in the nuclear power plant. Technical Report MUAP-08015, Section 9.9 (EQ Data Package or Data Sheets), under "Equipment Qualification Program," refers to US-APWR EQ Programs Pros-07, 09, and 16 and indicated that the EQ data for each Structure System and Component (SSC) will be compiled and organized for easy access by the licensee and other users. The staff needs to review whether the applicant's EQ documentation contains sufficient information that ensures the electrical and I&C equipment important to safety can withstand a harsh environmental condition and this information will be used to evaluate ITAAC. Provide the information that will be contained in the EQ Data Packages.

Sample EQ data package may contain the following information:

1. Positive statement by the applicant that the equipment is qualified for its application.
2. Full description of the equipment.
3. If qualification sample is not identical to the installed devices; a similarity analysis has been provided.
4. Allowed mounting methods and orientations.
5. Interfaces - conduit, housing, seal, etc.
6. A qualified life has been established based on accelerated aging - thermal, radiation, cyclic, as appropriate.
7. All type tests performed on the same test specimen.
8. Performance/acceptance criteria (operating time, transmitter accuracy to component).
9. Test sequence conforms to IEEE 323-1974 or justification for non-conformance has been provided.
10. Radiation dose covers accident and normal service.
11. Design basis event exposure simulation meets plant requirements.
12. Chemical or water spray simulation performed. (when required)
13. Accident environment margins.

14. Submergence test (if required).
15. Test anomalies resolved.
16. Applicable Information Notices resolved.
17. Maintenance/Surveillance Criteria
18. References clearly identified and attached or retrievable (including identification of plant equipment).

ANSWER:

The information to be contained in the Equipment Qualification Data Package (EQDP), the report required per 10 CFR 50.49(j), will be identified in the EQDP template, and the template will be presented in the Technical Report (TR) MUAP-08015 as Attachment-D. As indicated in Technical Report MUAP-08015, Section 9.9 (EQ Data Package or Data Sheets), the EQ data for each Structure System and Component (SSC) will be compiled and organized for easy access by the licensee and other users as a form of EQDP to demonstrate that the equipment qualification has been properly conducted under "Equipment Qualification Program". EQ documentation will contain sufficient information that ensures the electrical and I&C equipment located in harsh environment identified in Table 3D-2 can withstand a harsh environmental condition to be used to evaluate ITAAC.

EQ data package template will contain the following information:

1. Positive statement by the applicant that the equipment is qualified for its application.
2. Full description of the equipment.
3. If qualification sample is not identical to the installed devices; a similarity analysis has been provided.
4. Allowed mounting methods and orientations.
5. Interfaces - conduit, housing, seal, etc.
6. A qualified life has been established based on accelerated aging - thermal, radiation, cyclic, as appropriate.
7. All type tests performed on the same test specimen.
8. Performance/acceptance criteria (operating time, transmitter accuracy to component).
9. Test sequence conforms to IEEE 323-1974 or justification for non-conformance has been provided.
10. Radiation dose covers accident and normal service.
11. Design basis event exposure simulation meets plant requirements.
12. Chemical or water spray simulation performed. (when required)
13. Accident environment margins.
14. Submergence test (if required).
15. Test anomalies resolved.
16. Applicable Information Notices resolved.
17. Maintenance/Surveillance Criteria
18. References clearly identified and attached or retrievable (including identification of plant equipment).

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

Impact on Technical/Topical Report

Technical Report MUAP-08015 will be revised as shown in Attachment-1.

APWR EQ Program Application During Procurement. Also, Procedure number Pro-24, *US-APWR EQ Program Exceptions and Open Items* is applicable.

9.9 EQ Data Packages or Data Sheets.

MNES will interface and coordinate the actions of the PEQO. Project EQ Procedures shall address interfaces between the Project Organization.

The US-APWR PEQO is responsible for EQ data packages in accordance with industry standard practices. The EQ Data Package template is presented in this Technical Report as Attachment D. This is implemented by EQP procedure numbers: DCD_03.11-42_S01

Pro-07, *US-APWR EQ Program Quality Assurance Program*
Pro-09, *US-APWR EQ Program Application During Procurement.*
Pro-16 *US-APWR EQ Program Preparation of EQ Packages for Structures, Systems and Components (SSC).*

EQ data for each SSC will be compiled and organized for easy access by the licensee and other users of this information. The data is expected to be stored electronically with electronic copies of all test reports, specifications, analysis, etc. being retrievable electronically as discussed in a previous section.

9.10 Construction Phase

MHI/MNES, the A/E(s), Constructor(s) and licensee are responsible for this phase of project-specific EQP. During construction, the Constructor will be responsible for ensuring that mounting, support and connection configurations established during EQ is maintained in the installed condition. The work of performing the inspections may be delegated to the Project Quality Control Organization, but the responsibility remains with the PEQO. Deviations from the qualified configuration must be evaluated and documentation of the evaluations maintained in the EQ record files as Quality Assurance records in auditable form for the life of the plant.

Once the plant construction is initiated, a comprehensive EQ document control office is established on the plant site to receive, organize and control all EQ document packages. EQ Data Packages generated during the design and procurement phases will be transferred from other project organizations to this office for consolidation and archiving. Upon completion of construction and beginning with the first system startup activities, the construction document control is responsible for turnover of the complete EQ document package for a given system. EQ document packages are turned over to the utility (licensee) as systems are completed and accepted by the licensee.

Field changes will be reviewed by the PEQO to ensure that parameters established during EQ are maintained. Deviations will be evaluated and documented in the EQ record files. The following US-APWR EQP Procedures provide guidance to the PEQO on EQ activities during this phase of the Project.

Pro-05, *US-APWR EQ Program Documentation and Record Retention*
Pro-07, *US-APWR EQ Program Quality Assurance Program*
Pro-10, *US-APWR EQ Program Application during the Construction Phase*

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Attachment D Description of Equipment Qualification Data Package Template for MHI US-APWR Equipment Qualification Program

D.1 Introduction

As described in subsection 9.9 of this Technical Report, records and data documenting the qualification of electrical and mechanical equipment as a result of implementing the US-APWR Equipment Qualification Program (EQP) are maintained in the Equipment Qualification Data Packages. The Equipment Qualification (EQ) files contain copies of all pertinent EQ documentation (e.g., specifications, test reports, vendor data sheets, and analysis reports). The combined file is referred to as the Equipment Qualification Data Package (EQDP). Implementation of the EQ records retention process is governed by proprietary EQP procedures as discussed in this Technical Report. The EQDP tracks and maintains records for a specific equipment of Structure System and Component (SSC) starting at the completion of design when the equipment enters the procurement phase of a project. In general, most qualification activities take place during the procurement phase and could also occur during construction and startup. The documents generated during these phases of a project are maintained by the Project Equipment Qualification Organization (PEQO).

D.2 Purpose

The purpose of this attachment is to illustrate the content of the EQDP. The scope, qualification methods, verifications and requirements are described in this Technical Report, DCD Chapter 3.

D.3 Description of US-APWR Equipment Qualification Data Package

The EQ records for a specific equipment is generated in accordance with the methods and guidance contained in this Technical Report and the associated references such as RG 1.89 Rev.1, RG 1.100 Rev.3, IEEE 323-1974, IEEE 323-2003, IEEE 344-1987, IEEE 344-2004 and ASME QME-1-2007.

The EQDP is formulated during the project phases and has parts which are arranged for key EQ functions. The required data will be supplied by the PEQO, project design engineers or procurement personnel, and the information in the EQDP will be updated by the PEQO as the phase progresses. Designated reviewers review these records for accuracy and completeness.

As the project transitions from construction to operation, the EQDP and associated records (or copies thereof) will be transferred to the licensee's control to support the operational equipment qualification program (OEQP) as part of the plant turnover process.

EQDP consists of four parts, Part 1 to Part 4, as described below.

D.3.1 PART 1 EQUIPMENT QUALIFICATION SUMMARY

Part 1 identifies and summarizes the basic information and status of equipment to be qualified.

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D.3.2 PART 2 PROCUREMENT, INSTALLATION AND MAINTENANCE INFORMATION

Part 2 contains information pertinent to procurement, installation and maintenance, including the storage information, and tracks the equipment from the procurement up to turnover. Part 2 also lists the maintenance requirements, if any, for the equipment while in storage (warehouse) or after installation, prior to turnover to the plant licensee, which require periodic maintenance, specific storage requirements, special storage requirements, steps to maintain the equipment in a qualified state (e.g., large motors require electrical heat to prevent moisture intrusion or periodic shaft rotations to prevent distortion) or a combination of such in order to maintain their qualification status.

D.3.3 PART 3 ENVIROMENTAL AND SEISMICQUALIFICATION REQUIREMENTS

Part 3 summarizes the pertinent environmental and seismic qualification parameters that apply to the equipment. These requirements are dependent on the type of equipment (electrical or mechanical) and the location (Harsh or Mild) as well as other factors such as high energy line break, or flooding. The EQ and seismic requirements (values) are project specific.

D.3.4 PART 4 QUALIFICATION METHODS AND RECORDS

Part 4 consists of qualification records such as qualification test reports, analysis reports and other documents that provide verification that the equipment is properly qualified. Equipment Seismic Qualification Report (ESQR) as discussed in Attachment B of this Technical Report is introduced here.

D.3.5 Equipment Qualification Data Package Template

Below is the example of the Equipment Qualification Data Package Template

US-APWR EQUIPMENT QUALIFICATION DATA PACKAGE (EQDP) for US-APWR EQP
{EQDP No./Rev./Date Issued/Page No.}

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PART 1 EQUIPMENT QUALIFICATION SUMMARY

EQUIPMENT DESCRIPTION

Equipment Name	
Description of Safety Function(s) for application	
System/Plant Tag No.	
Location	
Environment Condition	
Safety Classification	
Seismic Classification	
Quality Group	
Manufacturer	
Subcontractor	
Model Number/Type/Style	
Unit No./Lot No./Batch No.	
Serial No.	
Materials	
10CFR50.59 Safety Evaluation	
Vendor QA Information	
Other Information	

EQUIPMENT QUALIFICATION PROGRAM CONCLUSIONS

The equipment identified and described in this EQDP is qualified for its intended application by means of one or a combination of the methods listed in Part 3. Validity of the qualification, including the tests, is evaluated and confirmed by documentation referenced hereafter:

References:
Qualification Report (1)
Qualification Report (2)

Comments

Prepared by
(Print, Sing, and Date)

Reviewed by
(Print, Sing, and Date)

Approved by
(Print, Sing, and Date)

Note: All documents pertinent to EQ, including the document for identification of plant equipment, is identified in references and attached or retrievable. Document title (if any), document number, revision, issue date are clearly identified for all the documents, including references, codes and standards, design documents, specifications, reports, procedures, manuals, instructions and drawings, wherever referenced in EQDP.

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PART 2 PROCUREMENT, INSTALLATION AND MAINTENANCE INFORMATION

Equipment Name _____
System/Plant Tag No. _____

PROCUREMENT INFORMATION

Product Specifications _____
Purchase Order _____
Date Ordered _____
Storage and Maintenance Requirements _____
Storage and Maintenance Testing Requirements _____
EQ Requirements Document _____
Seismic Requirements Document _____
Other Information _____
Comments _____

INSTALLATION INFORMATION

Installation Instructions _____
Special Installation Instructions _____
Installation Location _____
Date Installed _____
Other Information _____
Comments _____

ON SITE STORAGE/MAINTENANCE INFORMATION PRIOR TO TURNOVER

Receipt Inspection Report _____
Date Received _____
Vendor Manual _____
Vendor Drawings _____
Shelf life _____
Storage Location/Warehouse No. _____
Storage and Maintenance Instructions _____
Storage and Maintenance Testing Instructions _____
Date Required _____
Date Performed _____
Special Storage and Maintenance Instructions _____
Quantity on Hand _____
Qualified Quantity on Hand (as of date) _____
Date of Turnover _____
Comments _____

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PART 3 ENVIROMENTAL AND SEISMICQUALIFICATION REQUIREMENTS

Equipment Name _____
System/Plant Tag No. _____

ENVIROMENTAL REQUIREMENTS

General

Applicable Codes and Standards		
Location/Zone		
Environment (circle one)	Harsh	Mild
Mounting (Methods and Orientations)		
Interfaces/Connections		
Configuration		
Monitoring*1		
Aging		
Margin*2		
HELB (circle)	MSBL inside containment	LOCA
	MSBL outside containment	Other
Loss of HVAC		
Outdoor		
Containment Test Condition*3		
Design Life		
Shelf Life		
Description of Operating Cycles (including periodic testing)		
Number of Operating Cycles		
Qualified Life		
Synergistic Effects		
Test Sequence*4		
Other		

Service Conditions to be simulated	Normal	Abnormal	DBE*5	Post DBE
Temperature*2				
Pressure*2				
Humidity*2				
Radiation*2				
Vibration*2				
Chemical or Water Spray (yes/no)				
Chemical Effects-pH				
Chemical Composition				
Operating Time*2				
Post-Accident Time*2				
Post-Accident Aging*2				
Submergence*6				

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Electrical Equipment

Applicable Codes and Standards	
Voltage*2	
Frequency*2	
Load	
EMI/RFI	
Accuracy	
Response Time	
Insulation	
Current	
Other	

Mechanical Equipment

Applicable Codes and Standards	
Material	
Grease/Oil	
Gasket	
Thrust	
Torque	
Time	
Load Profile	
Other	

SEISMIC REQUIREMENTS

Applicable Codes and Standards	
Seismic Category	
Acceleration*2 of Seismic Vibration	
SSE RRS	
OBE ISRS	
Other OBE ISRS	
FIRS (g)	
Other	

INFORMATION NOTICES (INs)

Applicable INs	

*1: Applicable monitoring variables are identified in accordance to Categories I to VII per IEEE323-1974.
*2: Margins indicated in Table 4-2 US-APWR EQP Margin Values of this Technical Report are applied.
*3: See subsection 5.4 of MUAP-08015 for detail information.
*4: Test Sequence conforms to IEEE 323-1974, or justification for non-conformance is identified.
*5: DBE: Design Basis Event
*6: The margin described in Note 1 of Table 4-2 US-APWR EQP Margin Values of this report is applied.

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PART 4 QUALIFICATION METHODS AND RECORDS

Equipment Name _____
System/Plant Tag No. _____
Applicable Qualification Method(s) _____

ENVIROMENTAL QUALIFICATION BY TESTING

Applied Codes and Standards _____
Test Agency _____
Address _____
Test Procedure _____
Sample Size _____
Sample Similarity Analysis* _____
Preoperational Test(s) _____
Special Test(s) _____
Other _____
Summary of Tests _____
Calibration Report(s) _____
Environmental Test Report _____
Quality Assurance Review _____
Test Report Review _____
Test Anomalies Resolved (if any) _____
Comments _____

ENVIRONMENATAL QUALIFICATION BY ANALYSIS

Applied Codes and Standards _____
Analysis Procedure _____
Other _____
Analysis Report _____
Quality Assurance Review _____
Analysis Report Review _____
Comments _____

SEISMIC QUALIFICATION BY TESTING

Applied Codes and Standards _____
Test Agency _____
Address _____
Test Procedure _____
Sample Size _____
Sample Similarity Analysis* _____
Other _____
Summary of Tests _____
Seismic Test Report _____
Quality Assurance Review _____
Test Report Review _____
Test Anomalies Resolved (if any) _____
Comments _____

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SEISMIC QUALIFICATION BY ANALYSIS

Applied Codes and Standards	
Analysis Procedure	
Other	
Analysis Report-(ESQR*)	
Quality Assurance Review	
Analysis Report Review	
Comments	

INFORMATION NOTICES (INs)

Applicable INs Resolved	

*7: Qualification sample is identical to the installed devices and all type tests are performed on the same test specimen. If the sample is not identical, similarity analysis is provided.

*8: ESQR: Equipment Seismic Qualification Report