

  
**MITSUBISHI HEAVY INDUSTRIES, LTD.**  
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TOKYO, JAPAN

October 15, 2012

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-12279

**Subject: MHI's Response to US-APWR DCD RAI No.962-6578 (SRP 08.03.01)**

**References:** 1) "Request for Additional Information No. 962-6578, SRP Section: 08.03.01 – AC Power Systems (Onsite), Application Section: 8.3.1", dated October 1, 2012.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Response to Request for Additional Information No. 962-6578 (SRP 08.03.01)".

Enclosed is the response to 1 RAI question contained within Reference 1.

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,

*Y. Ogata*

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

Enclosure:

1. Response to Request for Additional Information No. 962-6578 (SRP 08.03.01)

*DOB1  
MRO*

CC: J. A. Ciocco  
J. Tapia

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Docket No. 52-021  
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Enclosure 1

UAP-HF-12279  
Docket No.52-021

Response to Request for Additional Information No. 962-6578  
(SRP 08.03.01)

October 2012

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**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**

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10/15/2012

**US-APWR Design Certification  
Mitsubishi Heavy Industries  
Docket No. 52-021**

**RAI NO.:** NO. 962-6578  
**SRP SECTION:** 08.03.01 - AC POWER SYSTEMS (ONSITE)  
**APPLICATION SECTION:** 8.3.1  
**DATE OF RAI ISSUE:** 10/01/2012

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**QUESTION NO. : 08.03.01-46**

The regulatory basis for this question is discussed in 10 CFR 50.36, "Technical Specifications," Section (c)(2)(iii)(3), "Surveillance Requirements, and NUREG-0800, Standard Review Plan, Chapter 8.3.1, "AC Power Systems (ONSITE)."

In the response to RAI 818-5872, Question 08.03.01-42, the applicant provided the Qualification Testing Log for the Gas Turbine Generator (GTG) qualification. The log provided the performance of maintenance activities for Fuel Nozzle Cleaning, which consisted of removing, cleaning and re-installing the fuel nozzle in each of the two combustion chambers. The applicant's response also stated the following: The maintenance activity is recommended by the gas turbine engine manufacturer as part of the routine maintenance. This maintenance interval is tied to the number of starts of the gas turbine and is recommended by the manufacturer that the fuel nozzles be cleaned every 50 starts.

Since this routine maintenance activity was conducted as part of the Class 1E GTG qualification testing, it has therefore become part of the basis for acceptance of the GTG units as Class 1E-qualified power sources.

10 CFR 50.36, "Technical Specifications," Section (c)(2)(iii)(3), "Surveillance Requirements," states the following:

*Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.*

It appears the fuel nozzle cleaning activity falls under the description stated under 10 CFR 50.36 (c)(2)(iii)(3), and is bolstered by its integral role in the qualification process.

Also, in NRC's Inspection Report No. 05200021/2012-201, and Notice of Violation dated July 23, 2012, the NRC staff provided its findings during the inspection that took place from June 5, 2012 through June 8, 2012, at the Engine Systems, Inc. (ESI) facilities in Rocky Mount, NC where MHI performed the GTG qualification testing. The purpose of the limited-scope inspection was to verify that Mitsubishi Heavy Industries, Ltd (MHI) effectively implemented

quality assurance (QA) processes and procedures for testing activities performed in support of the U.S. Advanced Pressurized-Water Reactor design certification application. Based on the results of this inspection, the NRC determined that four Severity Level IV violations of NRC requirements occurred. One of the violations identified, Violation 05200021/2012-201-02, stated the following:

1. MHI failed to evaluate the impact of the maintenance activity on the GTG prior to conducting the tests.
2. MHI sent a new fuel nozzle cleaning procedure after the start and load acceptance test started, and approved the test procedure 8001517-FTP without including the scheduled maintenance in it.

The violation also indicated that MHI needed to discuss whether an explicit Surveillance Requirement for the fuel nozzle activity will be provided or the basis for not including one.

After MHI's response to the NOV was evaluated, the NRC staff sent a follow-up letter, dated September 17, 2012, indicating that MHI's response to NOV 05200021/2012-201-02 regarding failure to include the scheduled maintenance in the test procedure as required by the two design conditions of the gas turbine generators (GTG) was found to be inadequate because it did not address the cause for Mitsubishi Heavy Industries' (MHI) failure to evaluate the impact of the maintenance activity on the qualification and testing of the Class 1E GTG. The NRC staff asked MHI to explain how they will ensure that this maintenance activity, needed to maintain the qualification, will be appropriately addressed in the Technical Specifications.

Therefore, discuss whether an explicit Surveillance Requirement for the fuel nozzle activity will be provided or the basis for not including one.

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**ANSWER:**

In the response to RAI 876-6210 Question 08.03.01-43, submitted by MHI letter UAP-HF-12201 dated July 20, 2012 (ML122160025), MHI considered the need for a Technical Specification for the GTG fuel nozzle cleaning activity. MHI responded that there was no need for a Technical Specification because:

- 1) Fuel nozzle cleaning was not essential to the operability of the GTGs as described in the response to Question 08.03.01-44.
- 2) Fuel nozzle cleaning was a preventative maintenance task. Maintenance tasks are not included in the Technical Specifications and are more appropriately handled under the maintenance rule program and/or maintenance program.

In this current RAI, the NRC states that since the nozzle cleaning activity was conducted as part of the Class 1E GTG qualification testing, it has become part of the basis for acceptance of the Class 1E GTGs. The NRC further states that the nozzle cleaning activity should be included in the Technical Specifications since it meets the description of 10 CFR 50.36 (c)(2)(iii)(3).

Additionally, in the NRC's response to MHI regarding Notice of Violation (NOV) 052/00021/2012-201-02 dated September 17, 2012 (ML12255A233), the NRC stated that the nozzle cleaning activity needed to be addressed in the Technical Specifications to maintain the qualification of the GTGs.

To resolve the issues raised in RAI 876-6210, this current RAI, and NOV 052/00021/2012-201-02, MHI will revise the Chapter 16 Technical Specifications to include the GTG nozzle cleaning activity.

**Impact on DCD**

Tier 2 DCD Chapter 16, Technical Specifications, Section 3.8.1 and associated Bases, will be revised to include a new surveillance requirement as shown in Attachment 1.

**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 Reports**

There is no impact on technical / topical reports.

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE   | FREQUENCY  |
|--|--|
| <p>SR 3.8.1.19      Verify when started simultaneously from standby condition, each Class 1E GTG achieves:</p> <p style="margin-left: 40px;">a.      In <math>\leq 100</math> seconds, voltage <math>\geq 6762</math> V and frequency <math>\geq 59.4</math> Hz and</p> <p style="margin-left: 40px;">b.      Steady state voltage <math>\geq 6762</math> V and <math>\leq 7038</math> V, and frequency <math>\geq 59.4</math> Hz and <math>\leq 60.6</math> Hz.</p> | <p>[10 years</p> <p>OR</p> <p>In accordance with the Surveillance Frequency Control Program]</p> |
| <p><u>SR 3.8.1.20</u>      <u>Perform cleaning of fuel nozzles for each Class 1E gas turbine generator.</u></p>  | <p><u>Once per 50 gas turbine generator starts</u></p>   |

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## BASES

## SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.19

This Surveillance demonstrates that the Class 1E GTG starting independence has not been compromised. Also, this Surveillance demonstrates that each engine can achieve proper speed within the specified time when the Class 1E GTGs are started simultaneously.

[The 10 year Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3). OR The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.]

SR 3.8.1.20

This Surveillance performs cleaning of the two fuel nozzles on each Class 1E gas turbine generator. Each Class 1E gas turbine generator has two engines. Each engine has an attached combustion chamber. The fuel nozzle supplies fuel oil to the combustion chamber. There is a nozzle tip in the end of the fuel nozzle which atomizes and sprays the liquid fuel. The nozzle tip gets clogged as the number of gas turbine generator starts and stops increases. This is because the liquid fuel that remains in the nozzle tip is carbonized by heat from hot parts such as the combustion chamber, which remains hot for a while after the engine stops. Clogging of the nozzle tip causes abnormal fuel atomization and could cause failure of the gas turbine generator to start. This cleaning was performed during the Class 1E gas turbine generator qualification testing.

The Frequency of this Surveillance is once per 50 gas turbine generator starts as this Frequency of nozzle cleaning was used during the Class 1E gas turbine generator qualification per the manufacturer's recommendation. This manufacturer's recommendation was based on typical industrial experience including the use of lower quality fuel (e.g., A-type heavy oil) than is used for the Class 1E gas turbine generators.

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