16-5, KONAN 2-CHOME, MINATO-KU TOKYO, JAPAN

May 29, 2009

**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-09272

Subject:

Amended MHI's Response to US-APWR DCD RAI No. 133-1827 Revision 0

Question No. 16-18

Reference: 1) "REQUEST FOR ADDITIONAL INFORMATION NO. 133-1827 REVISION 0, SRP Section: 16 - Technical Specifications Application Section: TS Section 3.9, QUESTIONS for Technical Specification Branch (CTSB)" dated

December 18, 2008.

2) Letter MHI Ref: UAP-HF-09027 from Y. Ogata (MHI) to U.S. NRC, "MHI's Responses to US-APWR DCD RAI No.133-1827 Revision 0," dated

January 29, 2009.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document as listed in Enclosure.

Enclosed is the amended response to Question No. 16-18 of the RAIs contained within Reference 1. The initial response was contained in those submitted with Reference 2.

The RAI response contained in this amended version involves no technical changes from that in Reference 2. This amendment was made to correct unclear wording in the original version.

Please contact Dr. C. Keith Paulson, Senior Technical Manager, Mitsubishi Nuclear Energy Systems, Inc. if the NRC has questions concerning any aspect of the submittal. His contact information is below.

Sincerely, y. Og tu

Yoshiki Ogata.

General Manager- APWR Promoting Department

Mitsubishi Heavy Industries, LTD.

#### Enclosure:

1. "Amended Response to Question No.16-18 of Request for Additional Information No. 133-1827 Revision 0"

CC: J. A. Ciocco C. K. Paulson

# **Contact Information**

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Docket No. 52-021 MHI Ref: UAP-HF-09272

# Enclosure 1

UAP-HF-09272 Docket No. 52-021

Amended Response to Question No.16-18 of Request for Additional Information No.133-1827 Revision 0

May 2009

#### RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

5/29/2009

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

RAI NO.:

NO. 133-1827 REVISION 0

SRP SECTION:

**16 - TECHNICAL SPECIFICATIONS** 

**APPLICATION SECTION: TS SECTION 3.9** 

**DATE OF RAI ISSUE:** 

12/18/2008

#### **QUESTION NO.: 16-18**

Justify not providing TS requirements for Decay Time prior to fuel handling. Revise TS 3.9 and related information in the bases, as appropriate.

In APWR FSAR Table 15.7.4-1, Fuel Handling Accident Source Term Assumption, a minimum Decay Time of 24 hours is assumed as an initial condition in the accident analysis. Also, 10CFR50.36(c)(2)(ii) requires a limiting condition for operation (LCO) to be established for "a process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis."

#### ANSWER:

A new LCO will be established for the decay time prior to fuel handling.

#### Impact on DCD

The DCD will be modified to include the newly established LCO 3.9.8 for the decay time prior to fuel handling as shown in Attachment 1.

## Impact on COLA

The attached LCO (Attachment 1) will also be added to the COLA.

#### Impact on PRA

There is no impact on the PRA.

# Attachment 1

# 3.9 REFUELING OPERATIONS

3.9.8 Decay Time

LCO 3.9.8

The reactor shall be subcritical for  $\geq$  24 hours.

APPLICABILITY:

During movement of irradiated fuel assemblies within containment.

# **ACTIONS**

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Reactor subcritical < 24 hours.	A.1 Suspend movement of irradiated fuel assemblies within containment.	Immediately

# SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.9.8.1	Verify that the reactor has been subcritical for≥ 24 hours by verification of the date and time of subcriticality.	Prior to movement of irradiated fuel assemblies in reactor vessel

### **B 3.9 REFUELING OPERATIONS**

# B 3.9.8 Decay Time

### **BASES**

### **BACKGROUND**

The movement of irradiated fuel assemblies within containment or in the fuel handling area requires allowing at least 24 hours for radioactive decay time before fuel assembly handling can be initiated. During fuel handling, this ensures that sufficient radioactive decay has occurred in the event of a fuel handing accident (Refs. 1 and 2). Sufficient radioactive decay of short-lived fission products would have occurred to limit offsite doses from the accident to within the values reported in Chapter 15.

# APPLICABLE SAFETY ANALYSES

During movement of irradiated fuel assemblies, the radioactivity decay time is an initial condition design parameter in the analysis of a fuel handling accident inside containment or in the fuel handling area, as postulated by Regulatory Guide 1.183 (Ref. 1).

The fuel handling accident analysis inside containment or in the fuel handling area is described in Reference 2. This analysis assumes a minimum radioactive decay time of 24 hours.

Radioactive decay time satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

### LCO

A minimum radioactive decay time of 24 hours is required to ensure that the radiological consequences of a postulated fuel handling accident inside containment or in the fuel handling area are within the values calculated in Reference 2.

#### **APPLICABILITY**

Radioactive decay time is applicable when moving irradiated fuel assemblies in containment or in the fuel handling area. The LCO minimizes the possibility of radioactive release due to a fuel handling accident that is beyond the assumptions of the safety analysis. If irradiated fuel assemblies are not being moved, there can be no significant radioactivity release as a result of a postulated fuel handling accident. Requirements for fuel handling accidents inside containment or in the fuel handling area are also covered by LCO 3.7.12, "Fuel Storage Pit Water Level" and LCO 3.9.7, "Refueling Cavity Water Level".

## **ACTIONS**

## A.1

With a decay time of less than 24 hours, all operations involving movement of irradiated fuel assemblies within containment or in the fuel

## **BASES**

# ACTIONS (continued)

handling area shall be suspended immediately to ensure that a fuel handling accident cannot occur.

The suspension of fuel movement shall not preclude completion of movement to a safe position.

# SURVEILLANCE REQUIREMENTS

# SR 3.9.8.1

Verification that the reactor has been subcritical for at least 24 hours prior to movement of irradiated fuel in the reactor pressure vessel to the refueling cavity in containment or to the fuel handling area ensures that the design basis for the analysis of the postulated fuel handling accident during refueling operations is met. Specifying radioactive decay time limits the consequences of damaged fuel rods that are postulated to result from a fuel handling accident (Ref. 2).

### REFERENCES

- 1. Regulatory Guide 1.183,"Alternative Radiological Source Terms Evaluating Design Basis Accidents at Nuclear Power Reactors."
- 2. Subsection 15.7.4