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

June 4, 2009

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

Attention: Mr. Jeffery A. Ciocco

Docket No. 52-021
MHI Ref: UAP-HF-09277

**Subject:** MHI's Response to US-APWR DCD RAI No. 357-2621

**Reference:** 1) "Request for Additional Information No. 357-2621 Revision 0, SRP Section: 03.05.01.04 – Missiles Generated by Tornadoes and Extreme Winds, Application Section: 03.05.01.04," dated 5/07/2009.

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. 357-2621, Revision 0."

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

Please contact Dr. C. Keith Paulson, Senior Technical Manager, 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,
General Manager- APWR Promoting Department
Mitsubishi Heavy Industries, LTD.

Enclosure:

1. Response to Request for Additional Information No. 357-2621, Revision 0

CC: J. A. Ciocco
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Docket No. 52-021
MHI Ref: UAP-HF-09277

Enclosure 1

UAP-HF-09277
Docket No. 52-021

Response to Request for Additional Information No. 357-2621,
Revision 0

June, 2009

## RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

**6/04/2009**

**US-APWR Design Certification**

**Mitsubishi Heavy Industries**

**Docket No. 52-021**

| | |
|---|---|
| **RAI NO.:** | **NO. 357-2621 REVISION 0** |
| **SRP SECTION:** | **03.05.01.04 – Missiles Generated by Tornadoes and Extreme Winds** |
| **APPLICATION SECTION:** | **3.5.1.4** |
| **DATE OF RAI ISSUE:** | **05/07/09** |

**QUESTION NO. RAI 3.5.1.4-02-S01 (Supplemental RAI):**

In its response to RAI 3.5.1.4-02, MHI stated in part that the current COL information item, COL 2.3(1), listed in US-APWR DCD Tier 2 Table 1.8.2 and Subsection 2.3.1 requires any COL application for a site located outside as well as inside the continental United States to compare the design basis tornado parameters and tornado-generated missile spectra with those specified for the USAPWR design. No additional COL information item is therefore necessary to address COL applications for a site uniquely located outside the continental United States.

However, the staff finds that the current COL information item, COL 2.3(1), does not include the above statement, therefore, revise the COL 2.3(1) listed in USAPWR DCD Tier 2 Table 1.8.2 to include the following requirement:

- Any COL application for a site located outside as well as inside the continental United States is required to compare the design basis tornado parameters and tornado-generated missile spectra with those specified for the US-APWR design.

**ANSWER:**

MHI agrees that the requirement to compare the design basis tornado parameters and tornado-generated missile criteria for sites outside the continental United States to those parameters specified for the US-APWR design is not specifically stated. MHI believes the requirement to compare site-specific parameters to those specified for the US-APWR design is an implied statement.

Further, MHI intends to imply that regional climatology and local meteorology parameters are to be compared to those specified for the US-APWR design whether the plant is to be sited inside or outside the continental United States, not only the design basis tornado parameters and tornado-generated missile spectra. Therefore, COL Item 2.3(1) will be revised in the DCD to clarify that meteorology and climatology parameters for plant sites inside and outside the continental US are to be bounded by the standard US-APWR parameters, unless qualified by some other means.

**Impact on DCD**

See Attachment 1 for the mark-up of DCD Tier 2, Section 2.3, changes to be incorporated.

- Change the paragraph of Section 2.3 to the following:

  "The US-APWR is designed for meteorological information as specified in Table 2.0-1. The COL Applicant, whether the plant is to be sited inside or outside the continental US, is to provide site-specific pre-operational and operational programs for meteorological measurements, and is to verify the site-specific regional climatology and local meteorology are bounded by the site parameters for the standard US-APWR design or demonstrate by some other means that the proposed facility and associated site-specific characteristics are acceptable at the proposed site."

- Change COL 2.3(1) in Subsection 2.3.6 to the following:

| | |
|---|---|
| *"COL 2.3(1)* | *The COL Applicant, whether the plant is to be sited inside or outside the continental US, is to provide site-specific pre-operational and operational programs for meteorological measurements, and is to verify the site-specific regional climatology and local meteorology are bounded by the site parameters for the standard US-APWR design or demonstrate by some other means that the proposed facility and associated site-specific characteristics are acceptable at the proposed site."* |

See Attachment 2 for the mark-up of DCD Tier 2, Section 1.8, Revision 2, changes to be incorporated.

- Change COL 2.3(1) in Table 1.8-2 to the following:

| | |
|---|---|
| *"COL 2.3(1)* | *The COL Applicant, whether the plant is to be sited inside or outside the continental US, is to provide site-specific pre-operational and operational programs for meteorological measurements, and is to verify the site-specific regional climatology and local meteorology are bounded by the site parameters for the standard US-APWR design or demonstrate by some other means that the proposed facility and associated site-specific characteristics are acceptable at the proposed site."* |

**Impact on COLA**

The corresponding FSAR sections will need revision so the COL wording is consistent with the DCD, include a revision to FSAR Table 1.8-201 for the new COL wording.

**Impact on PRA**

There is no impact on the PRA.

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## 2.3 Meteorology

The US-APWR is designed for meteorological information as specified in Table 2.0-1. The COL Applicant, whether the plant is to be sited inside or outside the continental US, is to provide site-specific pre-operational and operational programs for meteorological measurements, and is to verify the site-specific regional climatology and local meteorology are bounded by the site parameters for the standard US-APWR design or demonstrate by some other means that the proposed facility and associated site-specific characteristics are acceptable at the proposed site.

### 2.3.1 Regional Climatology

Site-specific information is provided for regional climatology, including general climate conditions and frequency of severe weather phenomena as discussed in SRP 2.3.1 (Reference 2.3-6). Refer to Subsection 3.3.2.1 for a complete summary of design basis tornado parameters, including maximum wind speed, maximum rotational speed, maximum translational speed, radius of maximum rotational wind from center of tornado, atmospheric drop, and rate of pressure change. The extreme wind speed as stated in Table 2.0-1 corresponds to the criteria described in Subsection 3.3.1.1. Ultimate heat sink (UHS) meteorological conditions are dependent on the site-specific climatology and selection of UHS type, as discussed in Subsection 9.2.5. Annual exceedance values of zero and one percent are based on the EPRI Advanced Light Water Reactor Utility Requirements Document (Reference 2.3-8) and conservative estimates of historical high and low values for potential US-APWR sites. These values are considered to bound approximately 75% to 80% of the continental US (excluding Alaska).

### 2.3.2 Local Meteorology

Site-specific information on local meteorology is based on long-term data from nearby reasonably representative locations and shorter-term onsite data as discussed in SRP 2.3.2 (Reference 2.3-7).

### 2.3.3 Onsite Meteorological Measurements Program

The site-specific pre-operational and operational programs for meteorological measurements are to be provided, which may include offsite satellite facilities. RG 1.23 (Reference 2.3-1) contains guidance on acceptable onsite meteorological programs, and any deviations from RG 1.23 guidance are to be identified and justified on a site-specific basis.

Additional sources of meteorological data is to be obtained from National Weather Service stations and other meteorological programs such as other nuclear facilities, university and private meteorological programs. These sources may be used in the description of airflow trajectories from the site to a distance of 50 miles, particularly measurements made, locations and elevations of measurements, exposure of instruments, descriptions of instruments used, and instrument performance specifications.

### 2.3.4 Short-Term Atmospheric Dispersion Estimates for Accident Releases

For appropriate time periods up to 30 days after an accident, conservative estimates are provided of atmospheric dispersion factors ($\chi$/Q values) at the site's EAB, at the outer boundary of the LPZ, and at the MCR for postulated accidental radioactive airborne releases.

The short-term $\chi$/Q values are site-specific parameters. The $\chi$/Q values listed in Table 2.0-1 are bounding factors for a typical US-APWR sited in most areas of the US and can be used to calculate radiological consequences of design basis accidents. The MCR $\chi$/Q values for potential point source accident releases and the offsite $\chi$/Q values are also defined in Table 2.0-1 to envelop most existing plant site parameters because specific site meteorological data is not available. The COL Applicant is to provide conservative factors as described in SRP 2.3.4 (Reference 2.3-2). If a selected site will cause excess to the bounding $\chi$/Q values, then the COL Applicant is to demonstrate how the dose reference values in 10 CFR 50.34 (Reference 2.3-3) and the control room dose limits in 10 CFR 50, Appendix A, General Design Criteria 19 (Reference 2.3-4) are met using site-specific $\chi$/Q values.

### 2.3.5 Long-Term Atmospheric Dispersion Estimates for Routine Releases

For annual average release, bounding limits of annual $\chi$/Q values and deposition factors (D/Q values) are provided at the onsite (EAB) and offsite to evaluate individual dose.

The long-term $\chi$/Q values at the US-APWR EAB are site-specific. The factor of the US-APWR Depleted/Undepleted/Decayed $\chi$/Q value at the EAB bounds approximately 70% of site parameters with site boundaries located approximately 0.5 miles from the reactor. The offsite annual average $\chi$/Q value for food production provided in Table 2.0-1 is a maximum value that is not to be exceeded. The D/Q values are limits applicable to the US-APWR standard plant at both EAB and offsite locations. The COL Applicant is to characterize the atmospheric transport and diffusion conditions necessary for estimating radiological consequences of the routine release of radioactive materials to the atmosphere, and provide realistic estimates of annual average $\chi$/Q values and D/Q values as described in SRP 2.3.5 (Reference 2.3-5).

### 2.3.6 Combined License Information

*COL 2.3(1)* *The COL Applicant, whether the plant is to be sited inside or outside the continental US, is to provide site-specific pre-operational and operational programs for meteorological measurements, and is to verify the site-specific regional climatology and local meteorology are bounded by the site parameters for the standard US-APWR design or demonstrate by some other means that the proposed facility and associated site-specific characteristics are acceptable at the proposed site.*

**Table 1.8-2 Compilation of All Combined License Applicant Items for Chapters 1-19 (sheet 2 of 44)**

| COL ITEM NO. | COL ITEM |
|---|---|
| *COL 2.3(1)* | *The COL Applicant, whether the plant is to be sited inside or outside the continental US, is to provide site-specific pre-operational and operational programs for meteorological measurements, and is to verify the site-specific regional climatology and local meteorology are bounded by the site parameters for the standard US-APWR design or demonstrate by some other means that the proposed facility and associated site-specific characteristics are acceptable at the proposed site.* |
| *COL 2.3(2)* | *The COL Applicant is to provide conservative factors as described in SRP 2.3.4 (Reference 2.3-2). If a selected site will cause excess to the bounding $\chi$/Q values, then the COL Applicant is to demonstrate how the dose reference values in 10 CFR 50.34 (Reference 2.3-3) and the control room dose limits in 10 CFR 50, Appendix A, General Design Criteria 19 (Reference 2.3-4) are met using site-specific $\chi$/Q values.* |
| *COL 2.3(3)* | *The COL Applicant is to characterize the atmospheric transport and diffusion conditions necessary for estimating radiological consequences of the routine release of radioactive materials to the atmosphere, and provide realistic estimates of annual average $\chi$/Q values and D/Q values as described in SRP 2.3.5 (Reference 2.3-5).* |
| *COL 2.4(1)* | *The COL Applicant is to provide sufficient information to verify that hydrologic-related events will not affect the safety-basis for the US-APWR.* |
| *COL 2.5(1)* | *The COL Applicant is to provide sufficient information regarding the seismic and geologic characteristics of the site and the region surrounding the site.* |
| *COL 3.1(1)* | *The COL Applicant is to provide a design that allows for the appropriate inspections and layout features of the ESWS.* |
| *COL 3.2(1)* | *Deleted* |
| *COL 3.2(2)* | *Deleted* |