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October 25, 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-12286

Subject: MHI's Revised Response to US-APWR DCD RAI No. 842-5863 Revision 3 (SRP 03.04.01)

- References:** 1) "Request for Additional Information No. 842-5863 Revision 3, SRP Section 03.04.01 – Internal Flood Protection for Onsite Equipment Failures - Application Section: 3.4.1", dated October 18, 2011.
2) MHI Letter No. UAP-HF-11436, "MHI's Responses to US-APWR DCD RAI No. 842-5863 Revision 3", dated December 19, 2011.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Revised Response to Request for Additional Information No. 842-5863 Revision 3."

Enclosed is the revised response to Question 03.04.01-32 contained within Reference 1. This response supersedes the previous response to Question 03.04.01-32 in Reference 2 in its entirety. The response to the other question in Reference 2 is not changed by this document.

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.

Enclosures:

1. Revised Response to Request for Additional Information No. 842-5863 Revision 3

D081
NRD

CC: J. A. Ciocco
J. Tapia

Contact Information

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Docket No. 52-021
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Enclosure 1

UAP-HF-12286
Docket No. 52-021

Revised Response to Request for Additional Information
No. 842-5863 Revision 3

October 2012

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

10/25/2012

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: NO. 842-5863 REVISION 3
SRP SECTION: 03.04.01 – INTERNAL FLOOD PROTECTION FOR ONSITE
EQUIPMENT FAILURES
APPLICATION SECTION: 3.04.01
DATE OF RAI ISSUE: 10/18/2011

QUESTION NO.: 03.04.01-32:

In response to Questions 3.4.1-1 and 3.4.1-27, the applicant stated that several means are used to assure the functionality of watertight doors, and that these methods include remote indication of door positions provided to operators, and periodic visual inspections and functional tests. However, the DCD does not contain a COL information item requiring the the COL applicant to implement inspection and testing of the watertight doors, or on developing maintenance programs to ensure seal integrity is maintained.

The applicant is requested to:

- (a) Discuss in detail what constitutes acceptable maintenance, and what inspections and test should be conducted by the COL applicant. A discussion of the essential elements of the maintenance, and what inspections and test for the watertight doors/seals should be provided in the DCD.
 - (b) Identify in the DCD, a COL information item, requiring that the COL applicant address testing, inspection and maintenance of watertight doors/seals in the COL application.
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ANSWER (Revision 1):

In line with the discussion in response to Questions 3.4.1-17 and 3.4.1-27, the COL applicant should address periodic inspections and testing when developing operating and maintenance procedures, to ensure the integrity of water-tight doors in terms of sealing function in the COL application. Moreover, once any sort of degradation or fault is identified, the COL applicant as the plant owner and/or operator is required to repair them and recover the proper sealing function.

MHI will revise the DCD Tier 2 Subsection 3.4.1.3 to clearly describe the requirements for the COL applicant for developing inspection and testing procedures in accordance with manufacturer recommendations so that each water-tight door remains capable of performing its intended function, and will add the new COL Item 3.4(8) to DCD Tier 2 Table 1.8-2 and Subsection 3.4.3. See Impact on DCD for the changes.

Impact on DCD

See the attachment for the mark-ups of DCD Table 1.8-2 and DCD Section 3.4 for the changes to be incorporated.

- Add entry in Table 1.8-2 for new COL Item 3.4(8).
- Change the second sentence of the fourth paragraph of Subsection 3.4.1.3 to read as follows:

"Water-tight doors have remote position indication for closure verification and are subject to periodic visual inspection and functional testing to help maintain and demonstrate meeting their design function. Any aging-related degradation or fault is identified and repaired. The COL Applicant is responsible for developing inspection and testing procedures in accordance with manufacturer recommendations so that each water-tight door remains capable of performing its intended function."

- Add new COL Item 3.4(8) to Subsection 3.4.3 to read as follows:

"COL 3.4(8) The COL Applicant is responsible for developing inspection and testing procedures in accordance with manufacturer recommendations so that each water-tight door remains capable of performing its intended function."

Impact on R-COLA

COL Applicants that reference the US-APWR standard plant design are required to develop inspection and testing procedures in accordance with manufacturer recommendations so that each water-tight door remains capable of performing its intended function.

Impact on S-COLA

COL Applicants that reference the US-APWR standard plant design are required to develop inspection and testing procedures in accordance with manufacturer recommendations so that each water-tight door remains capable of performing its intended function.

Impact on PRA

There is no impact on the PRA.

Impact on Topical Report / Technical Report

There is no impact on the Topical Report / Technical Report.

Table 1.8-2 Compilation of All Combined License Applicant Items for
Chapters 1-19 (Sheet 3 of 36)

COL ITEM NO.	COL ITEM
COL 3.3(4)	<i>The COL Applicant is to provide the wind load design method and importance factor for site-specific category I and category II buildings and structures. The COL Applicant shall also verify that the site location does not have features promoting channeling effects or buffeting in the wake of upwind obstructions that invalidate the standard plant wind load design methods described above.</i>
COL 3.3(5)	<i>The COL Applicant is to note the vented and unvented requirements of this subsection to the site-specific category I buildings and structures.</i>
<u>COL 3.3(6)</u>	<i>The COL Applicant is responsible for verifying that the site specific design basis hurricane basic wind speeds, exposure category, and resulting wind forces are enveloped by the determinations in this section.</i>
COL 3.4(1)	<i>The COL Applicant is to address the site-specific design of plant grading and drainage.</i>
COL 3.4(2)	<i>The COL Applicant is to demonstrate the DBFL bounds their specific site, or is to identify and address applicable site conditions where static flood level exceed the DBFL and/or generate dynamic flooding forces.</i>
COL 3.4(3)	<i>Site-specific flooding hazards from engineered features, such as from cooling water system piping, is to be addressed by the COL Applicant.</i>
COL 3.4(4)	<i>The COL Applicant is to address any additional measures below grade to protect against exterior flooding and the intrusion of ground water into seismic category I buildings and structures.</i>
COL 3.4(5)	<i>The COL Applicant is to identify and design, if necessary, any site-specific flood protection measures such as levees, seawalls, floodwalls, site bulkheads, revetments, or breakwaters per the guidelines of RG 1.102 (Reference 3.4-3), or dewatering system if the plant is not built above the DBFL.</i>
COL 3.4(6)	<i>The COL Applicant is to identify any site-specific physical models used to predict prototype performance of hydraulic structures and systems.</i>
COL 3.4(7)	<i>The COL Applicant is responsible for the protection from internal flooding for those site-specific SSCs that provide nuclear safety-related functions or whose postulated failure due to internal flooding could adversely affect the ability of the plant to achieve and maintain a safe shutdown condition.</i>
<u>COL 3.4(8)</u>	<i>The COL Applicant is responsible for developing inspection and testing procedures in accordance with manufacturer recommendations so that each water-tight door remains capable of performing its intended function.</i>
COL 3.5(1)	<i>The COL Applicant is to have plant procedures in place prior to fuel load that specify unsecured equipment, including portable pressurized gas cylinders, located inside or outside containment and required for maintenance or undergoing maintenance is to be removed from containment prior to operation, moved to a location where it is not a potential hazard to SSCs important to safety, or seismically restrained to prevent it from becoming a missile.</i>

DCD_03.03.
02-5

DCD_02-03
S01

DCD_03.04.
01-32 S01

3.4.1.3 Flood Protection from Internal Sources

The US-APWR SSCs are designed to accommodate the effects of, and to be compatible with, the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including LOCAs. This subsection addresses the accommodations made for flooding from internal water sources, specifically from the following:

- Earthquakes
- Pipe breaks and cracks
- Fire fighting operations
- Pump mechanical seal failures

The combination of events is not considered. However, an earthquake event followed by fire fighting operations for an earthquake induced fire is considered.

Full-circumferential ruptures of non-seismic piping and failures of non-seismic equipment located in the R/B or power source buildings (PS/Bs) are considered in the evaluation of flooding caused by an earthquake. Non-seismic equipment~~For flood events caused by an earthquake, equipment or pipe (not classified as seismic category I) in the R/B are assumed to be fully compromised and the total volume of the fluid contained within the subject equipment or pipe contributes to the flood volume. Equipment or piping not classified as seismic category I in areas outside of the area of concern is also assumed to be fully compromised, and if the discharge fluids can not be demonstrated to be excluded from the area of concern, their volume is included in the flood volume. The US-APWR is designed for maximum water levels created by internal flooding sources. The internal flood design accommodates the effects of, and is compatible with, environmental conditions associated with normal operations, maintenance, testing, and postulated accidents, including LOCAs.~~

DCD_03.04.
01-29

Water-tight doors are used as protective barriers to prevent flood waters from spreading to adjacent divisions in various buildings and elevations. Water-tight doors have remote position indication for closure verification and are periodically inspected and tested to ensure proper functionality.~~Water-tight doors have remote position indication for closure verification and are subject to periodic visual inspection and functional testing to help maintain and demonstrate meeting their design function. Any aging-related degradation or fault is identified and repaired. The COL Applicant is responsible for developing inspection and testing are performed in accordance with operating procedures developed as per Subsection 13.5.2 in accordance with manufacturer recommendations so that each water-tight door remains capable of performing its intended function.~~

DCD_03.04.
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01-32 S01

Open pits are isolated within water tight compartments using water tight doors, penetration seals, and normally closed floor drains. In this manner, flooding effects caused by open pit water sloshing are considered.

For flood events caused by the postulated failure of piping, defined in Section 3.6, the rupture of the single worst-case piping in the area of concern is assumed in the flood

or configuration, or for a design or operating bases involving thermal and erosion problems.

3.4.3 Combined License Information

- COL 3.4(1) *The COL Applicant is to address the site-specific design of plant grading and drainage.*
- COL 3.4(2) *The COL Applicant is to demonstrate the DBFL bounds their specific site, or is to identify and address applicable site conditions where static flood level exceed the DBFL and/or generate dynamic flooding forces.*
- COL 3.4(3) *Site-specific flooding hazards from engineered features, such as from cooling water system piping, is to be addressed by the COL Applicant.*
- COL 3.4(4) *The COL Applicant is to address any additional measures below grade to protect against exterior flooding and the intrusion of ground water into seismic category I buildings and structures.*
- COL 3.4(5) *The COL Applicant is to identify and design, if necessary, any site-specific flood protection measures such as levees, seawalls, floodwalls, site bulkheads, revetments, or breakwaters per the guidelines of RG 1.102 (Reference 3.4-3), or dewatering system if the plant is not built above the DBFL.*
- COL 3.4(6) *The COL Applicant is to identify any site-specific physical models used to predict prototype performance of hydraulic structures and systems.*
- COL 3.4(7) *The COL Applicant is responsible for the protection from internal flooding for those site-specific SSCs that provide nuclear safety-related functions or whose postulated failure due to internal flooding could adversely affect the ability of the plant to achieve and maintain a safe shutdown condition.*
- COL 3.4(8) *The COL Applicant is responsible for developing inspection and testing procedures in accordance with manufacturer recommendations so that each water-tight door remains capable of performing its intended function.*

DCD_03.04.
01-32 S01

3.4.4 References

- 3.4-1 Reactor Site Criteria, Energy. Title 10 Code of Federal Regulations Part 100, U.S. Nuclear Regulatory Commission, Washington, DC.
- 3.4-2 General Design Criteria for Nuclear Power Plants, Domestic Licensing of Production and Utilization Facilities, Energy. Title 10 Code of Federal Regulations Part 50, Appendix A, U.S. Nuclear Regulatory Commission, Washington, DC.
- 3.4-3 Flood Protection for Nuclear Power Plants. Regulatory Guide 1.102, Rev. 1, U.S. Nuclear Regulatory Commission, Washington, DC, September 1976.