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April 11, 2014

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

Attention: Mr. Richard Rasmussen

Docket No. 52-021
MHI Ref: UAP-HF-14038

Subject: **Reply to Notice of Violation No. 05200021/2014-201-01 and 05200021/2014-201-02**

Reference: 1) "The U.S. Advanced Pressurized-Water Reactor Aircraft Impact Inspection, Nuclear Regulatory Commission Inspection Report No. 05200021/2014-201" dated March 19, 2014. (ML14064A271)

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") the responses to Notice of Violation No. 05200021/2014-201-01 and 05200021/2014-201-02 (Reference 1).

Enclosed is the response to the Notice of Violation contained within Reference 1.

The Inspection Report in Reference 1 also identified a minor violation. MHI has not provided, nor is required to provide, an official response. However, MHI is taking action to address the condition identified in the minor violation.

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

Sincerely,

Atsushi Kumaki

Atsushi Kumaki,
Manager, APWR Project Group
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Enclosures:

1. MHI Response to Notice of Violation No. 05200021/2014-201-01 for Aircraft Impact Assessment
2. MHI Response to Notice of Violation No. 05200021/2014-201-02 for Aircraft Impact Assessment

CC: J. Tapia

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Enclosure 1

UAP-HF-14038
Docket No. 52-021

US-APWR
MHI Response to Notice of Violation No. 05200021/2014-201-01
for Aircraft Impact Assessment

April 2014

MHI Response to Notice of Violation No. 05200021/2014-201-01
for Aircraft Impact Assessment

1. Content of Notice of Violation (NOV)

Title 10, of the Code of Federal Regulations (10 CFR), Section 50.150, "Aircraft Impact Assessment," Paragraph (b)(2) requires that for applicants identified in paragraph (a)(3) of this section, the preliminary or final safety analysis report, as applicable, must include a description of how the design features and functional capabilities identified in paragraph (a)(1) of this section meet the assessment requirements in paragraph (a)(1) of this section.

Contrary to the above, as of January 27, 2014, MHI failed to describe in Revision 4 of the U.S. APWR Design Control Document (DCD) how the remote shutdown console (RSC) met the assessment requirements. The DCD credits the RSC as a design feature credited to show that the reactor core remains cooled, or the containment remains intact; and spent fuel cooling or spent fuel pool integrity is maintained; however, the location and orientation reflected in the DCD does not match the location and orientation required in the assessment. Specifically, the RSC required location and orientation changes to move it outside certain shock footprints that were noted in the assessment summary; however, these changes were not reflected in the DCD.

2. Reason for the violation, or, if contested, the basis for disputing the violation or severity level

The heat removal report of the Aircraft Impact Assessment (AIA) was prepared by ERIN Engineering and Research, Inc. (ERIN). During the evaluation, ERIN determined that certain strikes could result in a shock footprint that encompassed both the main control room (MCR) and the remote shutdown console (RSC) in the remote shutdown room (RSR). To address this, ERIN recommended that the RSC be reoriented inside the RSR by 90° such that it would no longer be in the shock footprint. ERIN provided this recommendation to MHI by e-mail. MHI agreed to make the change to reorient the RSC. As a result, the heat removal report prepared by ERIN indicates that no single strike could damage both the RSC and the MCR. MHI failed to revise the applicable drawing (N0-EJ22100 Rev.8) to reorient the RSC. MHI has a procedure to evaluate design change recommendations for AIA and incorporate them into the plant design. MHI did

not conduct the activity to evaluate and incorporate the recommendation to reorient the RSC based on the procedure. The reason is that MHI misunderstood the necessity of reorientation of the RSC since MHI thought the evaluation results of all 97 strike cases described in the ERIN heat removal report were acceptable without the reorientation of the RSC. This resulted in the inconsistency between the AIA report and the design inputs identified in this NOV.

3. Corrective action steps that have been taken and the result achieved, and the corrective steps that will be taken to avoid further violations

(1) MHI issued Corrective Action number CAR-14-006 on January 30, 2014, to document, track, and address this condition.

(2) MHI has revised the electric board layout drawing (N0-EJ22100 Rev.8) to reorient the RSC by 90°. The revised drawing (N0-EJ22100 Rev.9) was issued on February 19, 2014. Due to the revision of the electric board layout drawing, MHI has also revised the following layout drawings. The revised drawings were issued on February 24, 2014.

- N0-EH10158 Rev.2 General Arrangement Reactor Building Complex EL 76'5" (4F)
- N0-EH10192 Rev.3 Change List General Arrangement of Reactor Building Complex
- N0-EH10508 Rev.6 General Arrangement Power Block EL 76'5" (4F)

(3) MHI worked together with ERIN to revise the AIA report to indicate that the design change of reorienting the RSC has been performed. The revised AIA report (UAP-SGI-09001 Rev.4) was issued on March 20, 2014.

(4) The drawing changes described in item (2) above will be incorporated in a future official submittal of the DCD. The date of the submittal of the next revision of the DCD is not yet determined.

(5) As part of CAR-14-006, MHI evaluated the extent of this condition. MHI rechecked the AIA report and determined that there were no other design change recommendations from the AIA which were not reflected in the design. MHI rechecked the design change recommendations and determined that there were no other items which need to be evaluated by MHI.

(6) MHI trained design personnel in the procedure to evaluate and incorporate design change recommendations based on the assessment implementation plan. MHI completed the training on March 27, 2014.

4. Date when full compliance will be achieved

Full compliance has been achieved March 27, 2014 except for the official revision of the DCD described in item (4) above.

As described in the MHI letter UAP-HF-13256 dated November 5, 2013 (ML13311A109), MHI has implemented a coordinated slowdown of DCD licensing activities. The date of the submittal of the next revision of the DCD is not yet determined. Following the temporary slowdown period, MHI will work with the NRC to identify an appropriate schedule for the official DCD revision.

Enclosure 2

UAP-HF-14038
Docket No. 52-021

US-APWR
MHI Response to Notice of Violation No. 05200021/2014-201-02
for Aircraft Impact Assessment

April 2014

MHI Response to Notice of Violation No. 05200021/2014-201-02
for Aircraft Impact Assessment

1. Content of Notice of Violation (NOV)

Section 50.150 of 10 CFR, "Aircraft impact assessment," Paragraph (a)(1) requires that each applicant listed in 10 CFR 50.150(a)(3) shall perform a design-specific assessment of the effects on the facility of the impact of a large, commercial aircraft. Using realistic analyses, the applicant shall identify and incorporate into the design those design features and functional capabilities to show that, with reduced use of operator actions:

(i) the reactor core remains cooled, or the containment remains intact; and
(ii) spent fuel cooling or spent fuel pool integrity is maintained.

Contrary to the above, as of January 27, 2014, MHI failed to identify and incorporate into the DCD those design features and functional capabilities credited in the AIA to show the reactor remains cool, or containment remains intact; and spent fuel cooling or spent fuel pool integrity is maintained. Specifically, the AIA relied on main control room operator action prior to an aircraft impact to isolate the containment vent and purge lines, and the chemical volume and control system letdown isolation valves, to prevent fire from entering the containment and prevent a loss of coolant accident outside containment. However, the DCD does not describe the isolation of these two systems as design features needed for an aircraft impact scenario. This is an example of a violation of 10 C.F.R. § 50.150(a)(1).

In addition, MHI failed to credit a concrete heating, ventilation, and air conditioning soffit and fire barriers depicted via cut-away drawings around the 3F and 4F elevations in Chapter 19A, "U.S. APWR Beyond Design Basis Aircraft Impact Assessment," of the DCD that were utilized in the AIA. This is another example of a violation of 10 C.F.R. §50.150(a)(1).

2. Reason for the violation, or, if contested, the basis for disputing the violation or severity level

This NOV identifies several examples. Since the reason for each of the items listed as examples is slightly different, they are provided separately as follows:

(1) The heat removal report of the Aircraft Impact Assessment (AIA) contains the description of actions that will be taken in the event of an imminent threat by an aircraft. These actions including the closure of the containment vent and purge valves inside containment and the

closure of the letdown isolation valve inside containment. These actions prevent fire from entering the containment and prevent a loss of coolant accident (LOCA) outside containment. Since the closure of these valves is credited prior to the aircraft impact, the valves are not required to be operated in the assessment following the aircraft impact. As a result, MHI did not properly capture these valves during the screening of key design features credited in the assessment. Therefore, these features were not added to the description of key design features in the Design Control Document (DCD) Section 19A. This resulted in the inconsistency between the AIA report and the DCD identified as an example of this NOV.

(2) A. The heat removal report of the AIA credits the fire rating in the area of 3F/4F of the Reactor Building (R/B) non-radioactive controlled area (fire areas 414, 415, 412, 413, 405, and 406). The fire drawings in DCD Section 9A do not clearly show the barriers and barrier segments as they are part of a cut-away view. There is no explicit inconsistency between the AIA and the DCD, as the fire rating assumed in the heat removal report of the AIA is consistent with MHI's design input and intention. However, the DCD lacks the appropriate detail to clearly demonstrate the fire rating of the fire areas in this cut-away view. This causes the fire ratings to be open to interpretation and possibly confusing to the user. The lack of detail and clarity of the drawings resulted in the issue identified as an example of this NOV.

B. The heat removal report of the AIA credits the fire rating of a concrete heating, ventilation, and air conditioning (HVAC) soffit routed from the remote shutdown console (RSC) to the R/B west side corridor (connecting fire area 509 to 504). The fire drawings in DCD Section 9A do not clearly show the concrete HVAC soffit. There is no explicit inconsistency between the AIA and the DCD, as the fire rating assumed in the heat removal report of the AIA is consistent with MHI's design input and intention. However, the DCD lacks the appropriate detail to clearly demonstrate the fire rating of this concrete HVAC soffit. This causes the fire rating of this area to be open to interpretation and possibly confusing to the user. The lack of detail and clarity of the drawings resulted in the issue identified as an example of this NOV.

3. Corrective action steps that have been taken and the result achieved, and the corrective steps that will be taken to avoid further violations

3.1 Containment/Letdown Isolation

(1) MHI issued Corrective Action number CAR-14-007 on January 31, 2014, to document, track, and address the issue related to the containment vent and purge valves and letdown isolation valve.

(2) MHI will revise DCD Section 19A.4.4 to add the description of the containment isolation and letdown isolation as key design features. This change will be incorporated in a future official submittal of the DCD.

(3) As part of CAR-14-007, MHI evaluated the extent of this condition. MHI checked the AIA report and the description of DCD Section 19A. As part of the response to RAI 1082-7419 which was submitted by MHI letter UAP-HF-14028 dated March 14, 2014 (ML14083A011), MHI identified additional changes to DCD Section 19A which were required to better describe the system functions credited in the AIA. The DCD changes shown in the RAI response have been captured in the "Living DCD" and will be incorporated in a future official submittal of the DCD. MHI determined that after inclusion of these DCD changes, the system functions necessary for AIA are adequately described in DCD Section 19A.

3.2 Cut-away Views of the Fire Area Drawings

(1) MHI issued Corrective Action number CAR-14-010 on February 7, 2014, to document, track, and address the issue related to the fire areas for the R/B 3F/4F (i.e. the cut-away views).

(2) MHI revised the previous Fire Area Drawing and Fire Area List (N0-CG00102 Rev.6) and Fire Hazard Analysis (N0-EF51001 Rev.5) to clearly show the fire areas in the area of 3F/4F of the R/B non-radioactive control area (i.e. the cut-away views). The revised Fire Area Drawing and Fire Area List (N0-CG00102 Rev.7) and Fire Hazard Analysis (N0-EF51001 Rev.6) were issued on February 27, 2014 and February 28, 2014, respectively.

(3) MHI worked together with ERIN Engineering and Research, Inc. (ERIN) to revise the AIA report to be consistent with the changes described above. The revised AIA report (UAP-SGI-09001 Rev.4) was issued on March 20, 2014.

(4) MHI will revise DCD Section 9A to be consistent with the changes described above. This change will be incorporated in a future official submittal of the DCD.

(5) As part of CAR-14-010, MHI evaluated the extent of this condition. Another example of this condition is discussed in Section 3.3 below. MHI checked the layout drawings and the fire area drawings in the DCD. Other than that discussed in Section 3.3 below, MHI determined that there were no other layout or fire drawings in the DCD which are not clearly marked.

3.3. Fire Rating of the Concrete HVAC Soffit

(1) MHI issued Corrective Action numbers CAR-14-004 and CAR-14-010 on January 31, 2014 and February 7, 2014, respectively, to document, track, and address the issue related to the fire rating of the concrete HVAC soffit.

(2) MHI revised the previous Fire Area Drawing and Fire Area List (N0-CG00102 Rev.6) and Fire Hazard Analysis (N0-EF51001 Rev.5) to clearly show the fire area of the concrete HVAC soffit routed from the RSC to the R/B west side corridor. The revised Fire Area Drawing and Fire Area List (N0-CG00102 Rev.7) and Fire Hazard Analysis (N0-EF51001 Rev.6) were issued on February 27, 2014 and February 28, 2014, respectively.

(3) MHI worked together with ERIN to revise the AIA report to be consistent with the changes described above. The revised AIA report (UAP-SGI-09001 Rev.4) was issued on March 20, 2014.

(4) MHI will revise DCD Section 9A to be consistent with the changes described above. This change will be incorporated in a future official submittal of the DCD.

(5) As part of CAR-14-004 and CAR-14-010, MHI evaluated the extent of this condition. Another example of this condition is discussed in Section 3.2 above. MHI checked the layout drawings and the fire area drawing in the DCD. Other than that discussed in Section 3.2 above, MHI determined that there were no other layout or fire drawings in the DCD which are not clearly marked.

3.4 Other Errors or Insufficient Description

Other issues identified during the inspection and requiring corrective action are as follows:

(1) Three errors were found in Appendix B of Attachment-1 and one error was found in Appendix D of Attachment-1 of the AIA report (UAP-SGI-09001 Rev.3). In addition, the description of the water source of the charging pump and the legend for figures are missing in Appendix A and Appendix D of Attachment-1, respectively. MHI issued Corrective Action number CAR-14-004 on January 31, 2014 to document, track, and address the issue related to these errors and insufficient descriptions. These errors were corrected and the revised AIA report (UAP-SGI-09001 Rev.4) was issued on March 20, 2014.

(2) Insufficient description in the AIA report (UAP-SGI-09001 Rev.3) regarding whether one or two emergency feedwater (EFW) pits are required was found in some strikes cases. MHI issued Corrective Action number CAR-14-005 on January 30, 2014 to document, track, and address this insufficient description. The AIA report was modified to correctly describe the strike case requirements and the revised AIA report (UAP-SGI-09001 Rev.4) was issued on March 20, 2014.

(3) As part of CAR-14-004 and CAR-14-005 MHI evaluated the extent of these conditions.
    - For CAR-14-004, MHI checked the AIA report and determined that there were no other errors or missing descriptions in the AIA report.
    - For CAR-14-005, MHI checked the AIA report and determined that other components which have redundancy are sufficiently evaluated in each strike case.

3.5 Training

MHI trained design personnel in the following items. MHI completed the training on March 27, 2014.

(1) All key design features shall be described in the DCD Section 19A.

(2) Layout drawings shall be prepared in a manner that is easy to understand and avoids ambiguity.

4. Date when full compliance will be achieved

Full compliance has been achieved March 27, 2014 except for the official revision of the DCD described in several of the items above.

As described in the MHI letter UAP-HF-13256 dated November 5, 2013 (ML13311A109), MHI has implemented a coordinated slowdown of DCD licensing activities. The date of the submittal of the next revision of the DCD is not yet determined. Following the temporary slowdown period, MHI will work with the NRC to identify an appropriate schedule for the official DCD revision.