March 16, 2009

MEMORANDUM TO: Carey Bickett, Acting Branch Chief
US-APWR Projects Branch
Division of New Reactor Licensing
Office of New Reactors

FROM: Paul Kallan, Senior Project Manager /***RA/***
US-APWR Project Branch
Division of New Reactor Licensing
Office of New Reactors

SUBJECT: SUMMARY OF FEBRUARY 17 – 19, 2009, PUBLIC MEETING WITH MITSUBISHI HEAVY INDUSTRIES, ON DESIGN CONTROL DOCUMENT, CHAPTER 19 – PROBABILISTIC RISK ASSESSMENT (LEVEL 2 AND LOW POWER/SHUTDOWN) AND SEVERE ACCIDENT EVALUATION

On February 17 – 19, 2009, a Category 1 public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) and representatives of Mitsubishi Heavy Industries (MHI) at the U.S. Nuclear Regulatory Commission, 11545 Rockville Pike, Rockville, Maryland. The purpose of this meeting was to discuss in detail, MHI's methodologies, to discuss the reasoning in their analyses, and to clarify and resolve issues with regard to the Requests for Additional Information (RAIs) that were provided to the applicant prior to the meeting. A list of attendees is provided as Enclosure 1.

A public meeting notice was issued and documented in Agencywide Documents Access and Management System (ADAMS) with Accession Number (ML090360649). A Meeting Agenda (Enclosure 2) and Slides (Enclosures 3 - 5) were provided as handouts at the meeting and are available in ADAMS under Accession Number (ML090570848).

The first day, the NRC presented a discussion on the technical bases for severe accident progression assumptions. Another presentation was made by the NRC with regards to impact of instrumentation tube failure on natural circulation during severe accidents. Also, there was a discussion on the intent of specific RAI questions, in particular, 19-159, 19-160, 19-162 and 19-181 (available in ADAMS). During MHI's presentation on these subjects, the meeting was closed to allow discussion of proprietary information in the PRA Report (ML083080128).

The second and third days, MHI and the NRC discussed the shutdown Probabilistic Risk Assessment (PRA) development process. Detailed discussions with MHI included shutdown success criteria, gravity injection strategy, steam generator heat removal strategy, equipment availability during shutdown, plans for Level 2 shutdown PRA and plans for gathering insights and assumptions in the Design Control Document (DCD). In addition, RAI 138 and draft RAI 2201 (available in ADAMS) were discussed to clarify and to understand the intent of the RAIs.

Concluding Remarks

The staff thanked MHI for a detailed description of the US-APWR DCD Chapter 19 RAI discussions. The meeting concluded with the following action items. These action items will be resolved prior to the issuance of the Safety Evaluation Report (SER).

List of Action Items

1. The overall Steam Generator Tube Rupture (SGTR) issue needs to be addressed in more detail by MHI.

2. The probability values used for alternative scenarios such as SGTR need more explanation by MHI. MHI will provide additional information including a discussion on the basis for the use of 1/3 probability for competing path determination assumption.

3. MHI needs to address the potential for instrument tube failures.

4. MHI needs to address hydrogen ignition with regards to perfect mixing and the analysis that covers the various scenarios.

5. GOTHIC was used for some of the analyses of hydrogen concentration in local compartments or areas. The validity of the use needs to be confirmed by MHI as adequate by analysis or preferably by benchmarking against tests. The NRC will internally check the GOTHIC manuals to confirm its adequacy for modeling potential hydrogen mixing and burning.

6. MHI needs to explain why Loss of Coolant Accident (LOCA) analysis was used as a substitute for high pressure scenarios. Also, MHI needs to provide more information on structures and the containment configuration for specific breaks as it may impact release.

7. MHI needs to provide additional information on severe accident management.

8. MHI needs to explain in more detail the basis for the use of hot leg LOCA for transient cases.

9. Fans need to be evaluated to determine their ability to function adequately with postulated hot gas or non-condensable build up which might impact effectiveness. MHI will need to provide the NRC with additional information.

10. MHI needs to demonstrate the basis for use of FLOW-3D by reference or test.

11. The discussion of uncertainty needs to be expanded in the report by MHI.

12. MHI needs to confirm that the Residual Heat Removal System (RHR) pumps can function when boiling has occurred in the reactor vessel and there is a possibility that the RHR pump suction is a two phase flow. The NRC will issue an RAI on this topic.

13. MHI needs to address the issue of gravity injection when the man-way in the pressurizer is open. There is concern about entrainment of water to the pressurizer impacting gravity flow performance. The NRC will issue a draft RAI on this subject.

14. MHI needs to make sure all assumptions regarding procedures and operations are clearly documented and laid out in the Combined License (COL). MHI will supply additional information in response to RAI 138.

15. MHI needs to address potential for additional technical specifications for systems at Low Power Shut Down (LPSD) based upon the risk significance of such systems. The sensitivity case in previously requested information to be used to evaluate this but the approach will be for MHI to address directly the potential need for additional limits in the technical specifications to address risk significant systems at LPSD. MHI will provide additional informaiton in response to RAI 161. MHI requested an additional month to incorporate the additional discussion.

16. MHI needs to review Conditional Containment Failure Probablility calculations. NRC will issue a draft RAI on this subject.

17. MHI needs to review if ruthenium is evaluated in the source term analysis or not. The NRC will issue an RAI on this topic.

Members of the public were in attendance. Public meeting feedback forms were available, but none were returned.

Please direct any inquiries to Paul Kallan at 301-415-2809, or via e-mail Paul.Kallan@nrc.gov.

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Office of New Reactors

Docket No. 52-021

Enclosures:
As stated

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18. MHI needs to confirm that the Residual Heat Removal System (RHR) pumps can function when boiling has occurred in the reactor vessel and there is a possibility that the RHR pump suction is a two phase flow. The NRC will issue an RAI on this topic.

19. MHI needs to address the issue of gravity injection when the man-way in the pressurizer is open. There is concern about entrainment of water to the pressurizer impacting gravity flow performance. The NRC will issue a draft RAI on this subject.

20. MHI needs to make sure all assumptions regarding procedures and operations are clearly documented and laid out in the Combined License (COL). MHI will supply additional information in response to RAI 138.

21. MHI needs to address potential for additional technical specifications for systems at Low Power Shut Down (LPSD) based upon the risk significance of such systems. The sensitivity case in previously requested information to be used to evaluate this but the approach will be for MHI to address directly the potential need for additional limits in the technical specifications to address risk significant systems at LPSD. MHI will provide additional informaiton in response to RAI 161. MHI requested an additional month to incorporate the additional discussion.

22. MHI needs to review Conditional Containment Failure Probablility calculations. NRC will issue a draft RAI on this subject.

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| NAME | PKallan | CSmith | CBickett |
| DATE | 03/11/2009 | 03/16/2009 | 03/16/2009 |

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Public Meeting Attendance Sheet

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| Makoto Yamagishi | MHI |
| Hiroshi Goda | MHI |
| Katsuya Kuroiwa | MHI |
| Futoshi Tanaka | MHI |
| Takafumi Ogino | MHI |
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| Jin Chung | MNES |
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| Roy Karimi | ERI |
| Jim Fulford | ERI |
| Mohsen Kahtib-Rahbar | ERI |
| Charles Adder | NRC |
| Lynn Mrowca | NRC |
| Paul Kallan | NRC |
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| Theresa Clark | NRC |
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| Nicholas Saltos | NRC |
| Michael Norato | NRC |
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