

March 19, 2007

LICENSEE: MITSUBISHI HEAVY INDUSTRIES (MHI)  
FACILITY: US-APWR STANDARD DESIGN PRE-APPLICATION REVIEW  
SUBJECT: SUMMARY OF FEBRUARY 1, 2007, PUBLIC MEETING TO DISCUSS MHI'S  
PROPOSED TOPICAL REPORTS ON LOSS-OF-COOLANT ACCIDENT  
(LOCA) AND NON-LOCA METHODOLOGIES

On February 1, 2007, a Category 1 public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) staff and representatives of Mitsubishi Heavy Industries (MHI) at NRC Headquarters, Two White Flint North, 11545 Rockville Pike, Rockville, Maryland. The purpose of the meeting was to discuss MHI's plans to submit topical reports on loss-of-coolant accident (LOCA) and non-LOCA methodologies, as part of its pre-application activities related to the US-APWR design certification. MHI announced its intention to submit a design certification application for the US-APWR in December 2007. A list of attendees is provided as Enclosure 1. MHI presented handouts that are shown in Enclosures 2, 3, and 4 and can be assessed through the Agencywide Documents Access and Management System accession numbers ML070330374, ML070330380, and ML070330377.

MHI opened the meeting by discussing the proposed topical report on large break LOCA (LBLOCA) and the design of the US-APWR. The US-APWR consists of four reactor coolant system (RCS) loops with each RCS loop connected to the advanced accumulator system. The advanced accumulator system consists of four advanced accumulators, one for each RCS loop. The advanced accumulator system, which is a passive system, injects borated water when the RCS pressure falls below the accumulator operating pressure. The US-APWR has a high head safety injection system that consists of four safety independent trains. The safety injection pumps are aligned to take suction from the refueling water storage pit (RWSP) and deliver borated water directly to the safety injection nozzles on the reactor vessel. The RWSP is located inside the containment at the lowest part of the containment vessel. MHI plans to use the WCOBRA/TRAC code for system transient calculations. The ASTRUM methodology will be used to determine the peak cladding temperatures and local oxidation of cladding. MHI noted that the NRC has already approved of the WCOBRA/TRAC code and ASTRUM methodology for two, three and four loop pressurized water reactors, the AP600 and the AP1000. The NRC staff and MHI then discussed the process applying the WCOBRA/TRAC code to the advanced accumulator model. The GOTHIC code will be used to perform minimum containment pressure analysis. MHI plans to submit the LOCA topical report in July 2007.

Next, MHI discussed the LOCA mass and energy release methodology. MHI plans to use the SATAN code for the blowdown phase of the LOCA transient and the WREFLOOD code for the reflood portion of the LOCA transient. The NRC staff had previously approved of the SATAN and WREFLOOD codes for AP600 and AP1000. MHI stated there are several parameters that could affect mass and energy release following a LOCA. The advanced accumulator system injection flow rate could be affected, depending upon changes to the accumulator water level.

The release of heat from the neutron reflector and changes to the RWSP temperature are other parameters that affect mass and energy release. MHI plans to submit the LOCA mass and energy topical report in July 2007.

For non-LOCA analysis, MHI indicated that conventional non-LOCA codes and methodologies could be applied to the US-APWR and the supporting analysis would follow the guidance contained in Standard Review Plan Chapter 15. MHI discussed the following codes it plans to use for the non-LOCA analysis. MARVEL will be used as a plant system analysis code. The NRC staff approved of MARVEL in Topical Report WCAP-8843-P. MARVEL will be revised to account for the reactor coolant pump model and to apply the code to a four loop US-APWR simulation. TWINKLE will be used as a multi-dimensional neutron kinetics code for rod cluster control assembly ejection. The NRC staff approved of TWINKLE in Topical Report WCAP-7979-P-A. VIPRE-01 will be used a thermal hydraulics fuel transient code. MHI then presented the event specific scenarios and the codes that would apply to each of these specific events. MHI plans to submit a topical report for the non-LOCA analysis during the month of July 2007.

Members of the public were in attendance, but Public Meeting Feedback forms were not received. Please direct any inquiries to me at 301-415-1544, or [srm2@nrc.gov](mailto:srm2@nrc.gov).

*/RA/*

Stephen Raul Monarque  
AP1000 Projects Branch 1  
Division of New Reactor Licensing  
Office of New Reactors

Project No. 751

Enclosures:

1. List of Attendees
2. Mitsubishi Handout - US-APWR  
4<sup>th</sup> Pre-Application Review Meeting- Large Break LOCA  
Code and Methodology Applicability  
(ML070330374)
3. Mitsubishi Handout - US-APWR  
4<sup>th</sup> Pre-Application Review Meeting-LOCA Mass and Energy Release  
Code and Methodology Applicability  
(ML070330380)
4. Mitsubishi Handout - US-APWR  
4<sup>th</sup> Pre-Application Review Meeting-Non-LOCA Methodology  
(ML070330377)

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Attendees

Public Meeting to Discuss

LOCA and Non-LOCA Topical Reports

February 1, 2007

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Masato Ando	Japan Atomic Power Company
Jack Rosenthal	Talisman
Stephen R. Monarque	NRC
Alan Levin	AREVA
Ralph Landry	NRC
Edward D. Throm	NRC
Y. Gene Hsii	NRC
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Jorge Solis	NRC
David Bessette	NRC/Research
Harold Scott	NRC/Research
Hiroyuki Naito	Nuclear and Industrial Safety Agency
Yumi Kawanago	Mitsubishi Heavy Industries (MHI) - MNES
Masahiko Kaneda	MHI
Takahiro Imamura	MNES
Don Woodlan	TXU Power
Michitaka Kikuta	MHI
Hiroshi Nojiri	MNES
Masayuki Kambara	MHI
Kiyoshi Yamauchi	MHI
Toshisada Kato	MHI
Mike Snodderly	NRC
C. Keith Paulson	MHI
Douglas Wood	Advent Engineering
Makoto Toyama	MHI
Junto Ogawa	MHI
Hisanaga Takahashi	MHI
Shigemitsu Umezawa	MHI
Paul Gaukler	PWSP
Brad Maurer	Westinghouse

Enclosure 1

Enclosure 2

Mitsubishi Handout - US-APWR  
4<sup>th</sup> Pre-Application Review Meeting-  
Large Break LOCA Code and Methodology Applicability

(ML007330374)

Enclosure 3

Mitsubishi Handout - US-APWR  
4<sup>th</sup> Pre-Application Review Meeting -  
LOCA Mass and Energy Release Code and Methodology Applicability

(ML070330380)

Enclosure 4

Mitsubishi Handout - US-APWR  
4<sup>th</sup> Pre-Application Review Meeting-  
Non-LOCA Methodology

(ML070330377)

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