UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

September 22, 2010

MEMORANDUM TO: ACRS Members

FROM: Neil Coleman, Senior Staff Scientist /RA/
Reactor Safety Branch B, ACRS

SUBJECT: CERTIFICATION OF THE MINUTES OF THE ACRS SUBCOMMITTEE ON THE U.S. ADVANCED PRESSURIZED WATER REACTOR, JUNE 7, 2010

The minutes for the subject meeting were certified on September 22, 2010. Along with the transcripts and presentation materials, this is the official record of the proceedings of that meeting. A copy of the certified minutes is attached.

Attachment: As stated

cc w/o Attachment: E. Hackett
C. Santos
A. Dias

cc w/ Attachment:

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

MEMORANDUM TO: Neil Coleman, Senior Staff Scientist
Reactor Safety Branch B - ACRS

FROM: J. Stetkar, Chairman
U.S. Advanced Pressurized Water Reactor Subcommittee

SUBJECT: MINUTES OF THE MEETING OF THE ACRS SUBCOMMITTEE ON THE U.S. ADVANCED PRESSURIZED WATER REACTOR ON JUNE 7, 2010, IN ROCKVILLE, MD

I hereby certify, to the best of my knowledge and belief, that the minutes of the subject meeting are an accurate record of the proceedings for that meeting.

/RA/ September 22, 2010
J. Stetkar Date

Chairman of ACRS's Subcommittee on the
U.S. Advanced Pressurized Water Reactor

Certified On: September 22, 2010
By: John Stetkar

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
JUNE 7, 2010
ROCKVILLE, MD

Introduction

The ACRS Subcommittee on the U.S. Advanced Pressurized Water Reactor (US-APWR) met on June 7, 2010 at NRC headquarters in Rockville, MD. John Stetkar, Chairman, presided. The Subcommittee met with NRC staff members and members of the public. The purpose of this meeting was for the Subcommittee members to hear briefings by NRC staff members and representatives of Mitsubishi Heavy Industries (MHI) related to Chapters 2 and 16 of the US-APWR Design Certification Application and the staff's Draft Safety Evaluation Report.

- AGENDA - JUNE 7, 2010			
Topics		**Presenters**	**Presentation Time**
1.	Introduction	John Stetkar, ACRS	8:30 am – 8:35 am
2.	NRC Staff Introduction	NRO Staff	8:35 am – 8:40 am
3.	US-APWR Design Certification Application, Tier 2, Ch. 2, **Site Characteristics** [OPEN]	Mitsubishi Heavy Industries, Ltd	8:40 am –10:30 am
Break			10:30 am – 10:45 am
4.	SER with Open Items, US-APWR Design Certification Application, Tier 2, Ch. 2, **Site Characteristics** [OPEN]	NRO Staff	10:45 am – Noon
Lunch			Noon – 1:00 pm
5.	US-APWR Design Certification Application, Tier 2, Ch. 16, **Technical Specifications** [OPEN]	Mitsubishi Heavy Industries, Ltd	1:00 pm – 3:00 pm
Break		3:00 pm – 3:15 pm	
6.	SER with Open Items, US-APWR Design Certification Application, Tier 2, Ch. 16, **Technical Specifications** [OPEN]	NRO Staff	3:15 pm – 5:00 pm
Public Comments			5:00 pm – 5:15 pm
Meeting Adjourned			

Attendees (6/7/2010)

ACRS Members/Staff

John Stetkar, Chairman
Dennis Bley
Mario Bonaca
William Shack
Neil Coleman (DFO)

NRC Staff

Jeff Ciocco
Siaw Ng
Hossein Hamzehee
Brad Harvey
Seshagiri Tammara
Zuhan Xi
Michelle Hart
William Ward
Nebiyu Tiruneh
Stephen Monarque
Yong Li
Christopher Cook
Ngola Otto
B. P. Jain
Dan O'Neal
Rebecca Karas
Khoi Nguyen
Kimberley Corp
Hien Le
Mark Kowal
Derek Scully
Royce Beacom
Joe DeMarshall
C. Craig Harbuck
Dayna Dority
Travis Chapman
Ian Jung
Don Dube
Lynn Mrowca
Theodore Tjader

MHI

Atsushi Kumaki
Kazuki Okabayashi
Etsuvo Saji
Makoto Takashima

MNES

Masamori Onozuka
Diane Yeager
Diane Mory
Shinji Kiuchi
Musato Oba
Hiroshi Hamamoto
Ryan Sprengel
Hiroshi Shirasawa

Luminant

Don Woodlan

The presentation slides used by presenters are attached to the transcript of this meeting at the following website: http://www.nrc.gov/reading-rm/doc-collections/acrs/tr/subcommittee/. The presentations to the Subcommittee are summarized below. There were no requests by members of the public to make written or oral statements.

June 7, 2010 - OPENING REMARKS BY CHAIRMAN STETKAR

Chairman John Stetkar brought the meeting to order and announced that it is a meeting of the Subcommittee on the U.S. Advanced Pressurized Water Reactor. Neil Coleman of the ACRS staff was the Designated Federal Official for this meeting. Chairman Stetkar stated that the purpose of the meeting is for the Subcommittee to review Chapters 2 and 16 of the NRC Safety Evaluation with open items for the US-APWR designed rollout. Chapter 2 is site characteristics and Chapter 16 is technical specifications. Chapter 2 of the Design Control document focuses on the geography and demography, nearby facilities and site parameters for the design, including meteorology and climatology, geology, seismology and geotechnical parameters. Chapter 16

includes required technical specifications that set forth the safety limits, limiting safety system settings, limiting conditions for operation, and other limitations on facility operation deemed necessary to protect public health and safety.

Chairman Stetkar noted that the rules for participating in the meeting were announced in the meeting notice previously published in the Federal Register. Later in the day there would be an opportunity for stakeholder comments. The Subcommittee had received no additional written comments or requests for time to make oral statements from members of the public, and received no requests for people to participate via a bridge phone line. A transcript of the meeting was kept and will be made available as stated in the Federal Register notice.

Chairman Stetkar stated that the meeting would proceed, with presentations by the NRC staff and MHI. He introduced Mr. Hossein Hamzehee of the NRC staff. Mr. Hamzehee is NRC's Branch Chief for the US-APWR Projects. Mr. Hamzehee then turned it over to Atsushi Kumaki for the first presentation.

US-APWR Design Certification Application, Tier 2, Ch. 2, Site Characteristics

Atsushi Kumaki from MHI briefly summarized an outline of his talk, which included an overview, site characteristics key parameters, major requests for additional information (RAIs) from NRC, and a summary. Chapter 2 includes geological, seismological, geotechnical, hydrological, and meteorological characteristics. Values for specific parameters are given in a table in the overhead slides, which are appended to the end of the electronic minutes. One of the geotechnical parameters was the maximum differential settlement between buildings, with a value of 0.5 inches. This led to a Committee question regarding the basis for this value. One of the members was surprised at the claim that over the life of the plant there would be a settlement differential of less than half an inch. MHI intends to get back to the Subcommittee with an answer to this question.

Mr. Kumaki pointed out that three major changes from the original Design Control Document (DCD) are based on three of the RAIs:

1. Change of atmospheric dispersion factor (χ/Q) for 4-30 days - The staff found that the factor χ/Q for 4-30 days was too low because it was not representative of a reasonable number of sites in the U.S. This factor has been raised up to 1.5 times the original value to be more representative.

2. Change of source locations - Some pathways, where the source location is inside the building, imply indoor transport and dispersion. The ARCON96 are not appropriate for modeling "indoor" transport and dispersion. If the reactivity in the spilled reactor coolant is assumed to be discharged to the atmosphere from the plant vent stack for the purposes of modeling main control room doses, then the plant vent should be identified as the release pathway. MHI responded by noting that some source locations for accidents would be changed to a plant vent.

3. Description of additional information - DCD Tier 1 Table 2.1-1 and DCD Tier 2 Table 2.0-1 identify in-leakage locations for some postulated accidents and anticipated operational occurrences. COL applicants should be directed to evaluate χ/Q values for each in-leakage location (i.e. class 1E electrical room HVAC intake, auxiliary building HVAC intake, and reactor building door) for each accident release point and compare the resulting bounding χ/Q values

with corresponding key site parameter values listed in DCD Tier 1, Table 2.1-1, and DCD Tier 2, Table 2.0-1.

SER with Open Items, US-APWR Design Certification Application, Tier 2, Ch. 2, Site Characteristics

After the MHI presentation on Chapter 2 (Site Characteristics), Mr. Jeff Ciocco (NRO lead project manager) introduced the NRO staff review team. He gave an overview of the Design Certification Application, discussion of open items, and technical areas of interest (geography and demography, nearby industrial, transportation, and military facilities, meteorology, hydrological engineering, geology, seismology, and geotechnical engineering). Mr. Ciocco then presented the following table that summarizes the number of RAI questions and SE open items. The staff has received and is now reviewing responses from MHI for the five SE open items.

SRP Section/Application Section		Number of RAI Questions	Number of SE Open Items
2.0	Site Characteristics	1	0
2.1	Geography and Demography	0	0
2.2	Nearby Industrial, Transportation, and Military Facilities	0	0
2.3	Meteorology	33	4
2.4	Hydrologic Engineering	13	0
2.5	Geology, Seismology, and Geotechnical Engineering	5	1
Totals		52	5

Mr. Ciocco then introduced the first of several staff presenters for Chapter 2. The five open items for Chapter 2 are listed below:

• Open Item 02.03.04-8: Provide χ/Q site parameter values for containment releases to all Main Control Room in-leakage locations

• Open Item 02.03.04-9: Consolidate containment release source/receptor information

• Open Item 02.03.04-10: Correct DCD Tier 2 Table 2.3-3 listing of CR intake and in-leakage receptor heights

• Open Item 02.03.04-11: Increase 4-30 day MCR and TSC site parameter χ/Q values

• Open Item 02.05.04-1: Provide an explanation of the difference between the original proposed and the revised minimum allowable bearing capacity values.

The staff reported that, except for the SE open items, the applicant has identified an appropriate list of site parameters, and the assigned parameter values are expected to be representative of a reasonable number of sites that may be considered for a COL application.

The applicant has satisfactorily answered all the RAI's in Sections 2.0 (Site Characteristics), 2.1 (Geography and Demography), 2.2 (Nearby Industrial, Transportation, and Military Facilities), and 2.4 (Hydrologic Engineering). There are no open items in these sections.

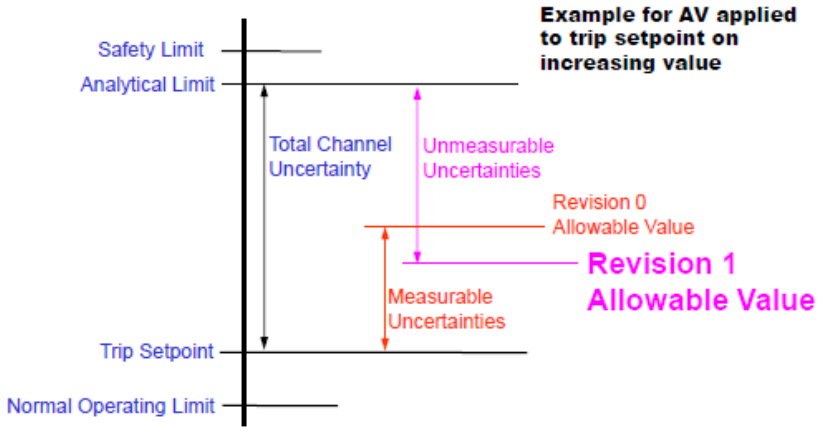
US-APWR Design Certification Application, Tier 2, Ch. 16, Technical Specifications

Chairman Stetkar reconvened the meeting for presentations on Chapter 16 (Technical Specifications). The presenter for MHI was Futoshi Tanaka. His talk described the scope of Chapter 16, summarized the technical specifications for the US-APWR, and reviewed the major RAIs. Chapter 16 includes the information required by 10 CFR 50.36. The US-APWR plant concept and the basic configuration of the main components are similar for current PWRs in the United States and in Japan. There are some differences, such as the US-APWR has a four-train safety system. A combination of active and passive systems is used for the accident mitigation. The tech specs for the US-APWR follow the standard technical specifications for Westinghouse PWRs. The redundancy of the four-train safety system is intended to maximize the benefits of on-line maintenance.

Three major RAIs were identified by the NRC staff to be addressed by MHI. These are summarized below:

1. Setpoints – Allowable Value Calculation

Allowable Value (AV) is the acceptance criterion for channel measurements during periodic surveillance. The NRC staff had commented that MHI's method of calculating AV does not provide sufficient allowance for those uncertainties not measured during the test. MHI is addressing this issue by revising the method of calculating the allowable value.



2. Setpoints – Allowable Value Application

Allowable value is traditionally applied to setpoints during channel operability tests. MHI's intent is to reduce the 2-step surveillance traditionally applied to analog channels to a single step for digital channels. The NRC staff has requested more detail on MHI's application of allowable value to channel calibration for digital functions.

3. Functional Verification Method

Logic functions and setpoints are traditionally checked by manual verification. MHI's intent is to eliminate all manual functional verification tests. The NRC staff have requested more detail on the US-APWR verification methods.

SER with Open Items, US-APWR Design Certification Application, Tier 2, Ch. 16, Technical Specifications

Jeff Ciocco (NRO) introduced the staff review team and summarized the status of requests for additional information (RAI). There were 290 RAIs for chapter 16, 216 of which have been resolved. Fifty-four open items remain. There are 20 confirmatory items, which means the staff has acceptable answers but is waiting to see them documented in Revision 3 of the DCD. Mr. Ciocco then introduced Bob Tjader of NRO, who continued the presentation.

Mr. Tjader showed the following list of categories of open items. Those items with an asterisk are the most significant categories to be further discussed, and these potentially could have an impact on schedules because the path to completion is not clear.

• TS Section 3.3 (Instrumentation) Issues
  - TADOT (Trip Actuating Device Operational Test) Surveillance Requirements (SR)*
  - Credit for Continuous Self-Test and Self-Diagnostics Features*
  - Post Accident Monitoring (PAM) Instrumentation*
• TS 3.4.9, Pressurizer Water Level LCO Value
• TS 3.4.12, LTOP Relief Valve single failure criteria met
• TS 3.5.2, ECCS Valve Operability Issues
• SR 3.8.1.8, Power Factor of 0.85 vs 0.9
• TS 3.9.4, Equipment Hatch Design Information
• TS 5.5.18 & 5.5.19, Risk-Informed Technical Specifications Metrics*
• T.S 5.5.21, Use of a Setpoint Control Program (SCP)
• Use of 10 CFR 50.36(c)(2)(ii) Criteria 4 on SSCs for Inclusion in TS

Significant Open Items

TS 5.5.18 and 5.5.19
• Risk-Informed Technical Specifications Metrics - A paper has been sent to the Commission presenting details about this issue.

TS 3.3 Instrumentation
• TADOT Surveillance Requirement - The staff is presently unable to make a conclusive determination regarding the capability of the TADOT to adequately verify the trip actuating device.

• Credit for Continuous Self-Test and Self-Diagnostics Features – These monitoring capabilities are being evaluated in Chapter 7 of the SER. Staff will determine the extent to which these features may be credited towards established requirements for periodic surveillance testing of reactor protection systems, and the justifications for several completion times, surveillance testing bypass times, and surveillance frequencies.

• PAM Instrumentation – Staff indicate that MHI has proposed a useable bounding list of PAM functions. COL applicants could incorporate the bounding list by reference. The staff is evaluating the PAM function list to see if the list is truly "bounding."

The overall staff finding so far is that there is a common understanding between MHI and the staff regarding the requirements that must be satisfied and how to do so. The staff's work appears to be manageable within the planned schedule.

Key Questions Raised by the Subcommittee - The following is a list of questions raised during the staff briefing that may be examined in more detail at a future briefing:

DCD Chapter 2

Question on Section 2.4 Hydrologic Engineering, Slide 6

A groundwater elevation 1 foot below plant grade is a relatively high groundwater level. Do any of the buildings in the US-APWR design have safety related equipment located more than 1 foot below grade level? If so, does the certified design contain dewatering systems for those buildings? Are there any cables routed through underground cable ducts? Does "plant grade" mean surface elevation?

Question on Section 2.5 Geology, Seismology, and Geotechnical Engineering, Slide 6

Did MHI give any consideration to using Regulatory Guide 1.208 to define spectra and use a performance-based approach rather than a uniform hazard approach?

Question on Section 2.3 Meteorology, Slide 6

A Category IV hurricane has sustained wind speeds between 131 miles per hour and 155 miles per hour. The gusts within a Category IV hurricane would probably exceed 155 MPH. How did MHI arrive at a 155 MPH, 3-second gust as having a 100 year return period? The return period for several locations, especially in the south and southeast and eastern coastal portions of the U.S. might be considerably less than 100 years for that type of gust. What is MHI's basis for a 100 year return period for that magnitude of wind gust?

Question on Section 2.5 Geology, Seismology, and Geotechnical Engineering, Slide 8

An item J refers to the maximum differential of settlement between buildings. Over time, the buildings will settle some. Can anyone ever build a facility at an actual site that will meet a specification of less than half an inch of settlement? How did MHI obtain this specification?

Question on Section 2.3 Meteorology, x/Q for TSC

For an RAI, one of the concerns was regarding a pipe break in the auxiliary building that caused a release inside the auxiliary building that could transfer to the technical support center. In the original analysis, a single door separated the auxiliary building from the technical support center. The revised analysis says that all of the releases in the auxiliary building will be removed through the auxiliary building ventilation system and distributed out through the plant stack. The only pathway is then from the plant stack, diluted in the atmosphere, into the ventilation intake for the technical support center. What is the basis for claiming that all of the releases will be removed through the auxiliary building ventilation system and that no releases can go through that door? Why did MHI remove the door as a pathway?

Question (in general)

One observation this Committee has made in the past is that in many respects these kinds of meteorological parameters come from past experience. The question is, if in fact we're going to have global warming and climate changes in the future, to what extent will these parameters continue to be acceptable? Is there any attempt on the part of MHI to build in some margin that will ensure that this database remains bounding in the future?

DCD Chapter 16

Question on Slide 5

On this slide it says "One train is not allowed out of service for more than 90 days in accordance with 10 CFR 50.59 and its guideline." 10 CFR 50.59 doesn't really specify a 90 day limit for anything. The NEI document that MHI has referred to is guidance, and it has no legal bearing in terms of licensing. It's a guideline and not part of the licensing basis of the plant. PRA might support an indefinite period of time to allow flexibility in performing surveillances and maintenance. If one train cannot be out of service for more than 90 days, why is 90 days not actually specified in the Technical Specifications, which indeed governs the operation and licensing basis for the plant? If MHI's intention is that no train of safety systems shall be removed for longer than 90 days, why would you not specify that limit in the Technical Specifications? How is the 90 day limit controlled? How does that maximize the benefit of on-line maintenance?

There are no technical specifications on the HVAC systems or the safety-related 4 train chilled water system. ACRS is aware that there is a screening process to identify risk-significant SSCs. What is the basis for screening out the chilled water system? In general, the ACRS is interested in reviewing the process used to identify which SSCs should be in the Technical Specifications, and which should not.