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February 4, 2009

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-09032

Subject: MHI's Responses to US-APWR DCD RAI No.136-1819 Revision 0

Reference: 1) "REQUEST FOR ADDITIONAL INFORMATION NO. 136-1819 REVISION 0, SRP Section: 16 - Technical Specifications Application Section: TS Section 3.6, QUESTIONS for Technical Specification Branch (CTSB)" dated December 22, 2008.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Responses to Request for Additional Information No.136-1819 Revision 0."

Enclosed is the responses to Questions 16-59 through 16-65 that are contained within Reference 1.

Please contact Dr. C. Keith Paulson, Senior Technical Manager, Mitsubishi Nuclear Energy Systems, Inc. if the NRC has questions concerning any aspect of the submittals. His contact information is below.

Sincerely,

Y. Ogata

Yoshiki Ogata,
General Manager- APWR Promoting Department
Mitsubishi Heavy Industries, LTD.

Enclosure:

1. Responses to Request for Additional Information No.136 Revision 0

CC: J. A. Ciocco
C. K. Paulson

D081
NRO

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Docket No. 52-021
MHI Ref: UAP-HF-09032

Enclosure 1

UAP-HF-09032
Docket No. 52-021

Responses to Request for Additional Information No.136-1819
Revision 0

February 2009

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

2/4/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 136-1819 REVISION 0**
SRP SECTION:	**16 - TECHNICAL SPECIFICATIONS**
APPLICATION SECTION:	**TS SECTION 3.6**
DATE OF RAI ISSUE:	**12/22/2008**

QUESTION NO.: 16-59

TS Section 3.6 (EDITORIAL).
The following editorial errors were noted in US-APWR TS 3.6:
1. Page B 3.6.2-2, APPLICABILITY, Last Sentence: The phrase "LCO 3.9.3" should be "LCO 3.9.4"

2. Page B 3.6.3-2, Background discussion: Under the High Volume Purge System discussion the Low Volume Purge System discussion should be a new paragraph.

3. Page B 3.6.3-3, APPLICABLE SAFETY ANALYSES, 3rd Paragraph: The phrase "15seconds" should be "15 seconds" at two places.

4. Page B 3.6.3-3, APPLICABLE SAFETY ANALYSES, 3rd Paragraph: Insert a line space at the end of the paragraph.

5. Page B 3.6.3-4, ACTIONS, 1st Paragraph: Delete the sentence "[a] single purge valve in a penetration flow path may be opened to effect repairs to an inoperable valve, as allowed by SR 3.6.3.1." because resilent seals are not used in APWR purge valves.

6. Page B 3.6.3-5, ACTIONS, A.1 and A.2: Second Paragraph: Remove the line space after the phrase "capable of being automatically"

7. Page B 3.6.3-8, SURVEILLANCE REQUIREMENTS, SR 3.6.3.1: Remove the sentence "[i]n the event purge valve leakage requires entry into Condition E, the Surveillance permits opening one purge valve in a penetration flow path to perform repairs." because resilent seals are not used in APWR purge valves.

8. Page B 3.6.5-1, BACKGROUND, Second Paragraph: The phrase "the Containment Spray and Cooling systems" should be "the Containment Spray system"

9. Page B 3.6.5-1, APPLICABLE SAFETY ANALYSES, Second Paragraph: Remove the phrase "and Containment Cooling System"

10. Page B.3.6.6-1, Background discussion: Replace text "The containment Spray System

consists of four separate trains of equal capacity, each capable of meeting 50% of the design basis." with "The containment Spray System consists of four separate trains of equal capacity, capable of meeting 50% of the design basis heat removal capacity."

11. Page B 3.6.6-1, BACKGROUND, First Paragraph: Remove the phrase "GDC 41, Containment Atmosphere Cleanup"

12. Page B 3.6.6-1, BACKGROUND, Third Paragraph: Remove the underlined "Containment Spray System"

13. Page B 3.6.6-3, APPLICABL SAFETY ANALYSES, Fifth Paragraph: The phrase "a - 3.8 psig" should be "a -3.9 psig"

14. Page B 3.6.6-6, SURVEILLANCE REQUIREMENTS, SR 3.6.6.3 and SR 3.6.6.4: Remove the paragraph "The surveillance of containment sump isolation valves is also required by SR 3.5.2.5. A single surveillance may be used to satisfy both requirements."

ANSWER:

TS 3.6 and related Bases are revised to incorporate the comments in QUESTION NO.16-59 item through 1 to 14.

Impact on DCD

1. The DCD Chapter 16, TS 3.6.2 BASES, APPLICABILITY, last sentence will be revised as follows:

> The requirements for the containment airlocks during MODE 6 are addressed in LCO 3.9.~~4~~3, "Containment Penetrations."

2. The DCD Chapter 16, TS 3.6.3 BASES, Background, Low Volume Purge System (8 inch purge valves) will be revised as follows:

> High Volume Purge System (36 inch purge valves)
>
> The High Volume Purge System operates to supply outside air into the containment for ventilation and cooling or heating and may also be used to reduce the concentration of noble gases within containment prior to and during personnel access. The supply and exhaust lines each contain two isolation valves. The 36 inch purge valves are normally maintained closed in MODES 1, 2, 3, and 4 to ensure the containment boundary is maintained.
>
> Low Volume Purge System (8 inch purge valves)

3. and 4. The DCD Chapter 16, TS 3.6.3 BASES, Applicable Safety Analyses, 3rd and 4th paragraphs will be revised. Please see the response to QUESTION 16-61.

5. The DCD Chapter 16, TS 3.6.3 and related BASES will be revised to be consistent with STS, NUREG-1431, so that the indicated sentence will remain. See answer to Question No.16-60.

6. The DCD Chapter 16, TS 3.6.3 BASES, Actions, A.1 and A.2, 2nd paragraph will be revised as follows:

> For affected penetration flow paths that cannot be restored to OPERABLE status within the 4 hour Completion Time and that have been isolated in accordance with Required Action A.1, the affected penetration flow paths must be verified to be isolated on a periodic basis. This is necessary to ensure that containment penetrations required to be isolated following an accident and no longer capable of being automatically isolated will be in the isolation position should an event occur. This Required Action does not require any testing or device manipulation. Rather, it

involves verification that those isolation devices outside containment and capable of being mispositioned are in the correct position. The Completion Time of "once per 31 days for isolation devices outside containment" is appropriate considering the fact that the devices are operated under administrative controls and the probability of their misalignment is low. For the isolation devices inside containment, the time period specified as "prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days" is based on engineering judgment and is considered reasonable in view of the inaccessibility of the isolation devices and other administrative controls that will ensure that isolation device misalignment is an unlikely possibility.

7. The DCD Chapter 16, TS 3.6.3 and related BASES will be revised to be consistent with STS, NUREG-1431, so that the indicated sentence will remain. See answer to Question No.16-60.

8. The DCD Chapter 16, TS 3.6.5 BASES, Background, 2nd paragraph will be revised as follows:

The containment average air temperature limit is derived from the input conditions used in the containment functional analyses and the containment structure external pressure analyses. This LCO ensures that initial conditions assumed in the analysis of containment response to a DBA are not violated during unit operations. The total amount of energy to be removed from containment by the Containment Spray ~~and Cooling systems~~ during post accident conditions is dependent upon the energy released to the containment due to the event, as well as the initial containment temperature and pressure. The higher the initial temperature, the more energy that must be removed, resulting in higher peak containment pressure and temperature. Exceeding containment design pressure may result in leakage greater than that assumed in the accident analysis. Operation with containment temperature in excess of the LCO limit violates an initial condition assumed in the accident analysis.

9. The DCD Chapter 16, TS 3.6.5 BASES, Applicable Safety Analyses, 2nd paragraph will be revised as follows:

The limiting DBAs considered relative to containment OPERABILITY are the LOCA and SLB. The DBA LOCA and SLB are analyzed using computer codes designed to predict the resultant containment pressure transients. No two DBAs are assumed to occur simultaneously or consecutively. The postulated DBAs are analyzed with regard to Engineered Safety Feature (ESF) systems, assuming the loss of two ESF buses, which is the worst case single active failure plus maintenance outage, resulting in two trains each of the Containment Spray/Residual Heat Removal System ~~and Containment Cooling System~~ being rendered inoperable.

10. The DCD Chapter 16, TS 3.6.6 BASES, Background, Containment Spray System, 1st paragraph, 1st sentence will be revised as follows:

The Containment Spray System consists of four separate trains of equal capacity, ~~each~~ capable of meeting 50% of the design basis~~bases~~ heat removal capacity.

11. The DCD Chapter 16, TS 3.6.6 BASES, Background, 1st paragraph, last sentence will be revised as follows:

The Containment Spray System is designed to meet the requirements of 10 CFR 50, Appendix A, GDC 38, "Containment Heat Removal," GDC 39, "Inspection of Containment Heat Removal Systems," and GDC 40, "Testing of Containment Heat Removal Systems," ~~and GDC 41, "Containment Atmosphere Cleanup,"~~ (Ref. 1).

12. The DCD Chapter 16, TS 3.6.6 BASES, Background, 3rd paragraph will be revised as follows:

~~Containment Spray System~~

13. The DCD Chapter 16, TS 3.6.6 BASES, Applicable Safety Analyses, 4th paragraph will be revised as follows:

The effect of an inadvertent containment spray actuation has been analyzed. An inadvertent spray actuation results in a -3.9~~3.8~~ psig containment pressure and is associated with the sudden cooling effect in the interior of the leak tight containment. Additional discussion is provided in the Bases for LCO 3.6.4.

14. The DCD Chapter 16, TS 3.6.6 BASES, Surveillance Requirements, SR 3.6.6.3 and SR 3.6.6.4, 2nd paragraph will be revised as follows:

~~The surveillance of containment sump isolation valves is also required by SR 3.5.2.5. A single surveillance may be used to satisfy both requirements.~~

Impact on COLA

There are impacts on the COLA to incorporate the DCD change.

Impact on PRA

There is no impact on the PRA.

2/4/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: NO. 136-1819 REVISION 0

SRP SECTION: 16 - TECHNICAL SPECIFICATIONS

APPLICATION SECTION: TS SECTION 3.6

DATE OF RAI ISSUE: 12/22/2008

QUESTION NO.: 16-60

TS 3.6.3, Containment Isolation Valves.

Justify not including TS requirements and associated discussions in the TS bases regarding the use of resilent seals in APWR containment purge isolation valves.

APWR TS 3.6.3 and the associated bases omitted all requirements as shown in the Westinghouse STS regarding resilent seals being used in the containment purge isolation valves (e.g., STS SR 3.6.3.7 and STS 3.6.3 Condition E). In addition, APWR FSAR Section 9.4.6, Containment Ventilation System, does not provide relevant information to indicate whether resilent seals are or are not being used in the design of APWR containment purge isolation valves.

This information is needed to ensure completeness of APWR TS requirements.

ANSWER:

The DCD Chapter 16, TS 3.6.3 and related BASES will be revised to be consistent with STS, NUREG-1431. This will leave the possibility of the using resilient seals in the containment purge isolation valves.

Impact on DCD

The DCD Chapter 16, TS 3.6.3 will be revised as follows:

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Only applicable to penetration flow paths with two containment isolation valves. ----------	A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve	4 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
One or more penetration flow paths with one containment isolation valve inoperable for reasons other than Condition D.	secured. AND A.2 ----------NOTES---------- 1. Isolation devices in high radiation areas may be verified by use of administrative means. 2. Isolation devices that are locked, sealed, or otherwise secured may be verified by use of administrative means. ---------- Verify the affected penetration flow path is isolated.	Once per 31 days for isolation devices outside containment AND Prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. ----------NOTE---------- Only applicable to penetration flow paths with two containment isolation valves. ---------- One or more penetration flow paths with two containment isolation valves inoperable for reasons other than Condition D.	B.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange.	1 hour

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more penetration flow paths with one or more high volume purge valves not within purge valve leakage limits.	D.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange.	24 hours
	AND	
	D.2 ----------NOTES---------- 1. Isolation devices in high radiation areas may be verified by use of administrative means. 2. Isolation devices that are locked, sealed, or otherwise secured may be verified by use of administrative means. ---------- Verify the affected penetration flow path is isolated.	Once per 31 days for isolation devices outside containment AND Prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment
	AND	
	D.3 Perform SR 3.6.3.6 for the resilient seal purge valves closed to comply with Required Action D.1.	Once per 92 days

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
ED. Required Action and associated Completion Time not met.	ED.1 Be in MODE 3. AND ED.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.3.1	Verify each 36 inch high volume purge valve is sealed closed, except for one high volume purge valve in a penetration flow path while in Condition D of this LCO.	[31 days OR In accordance with the Surveillance Frequency Control Program]

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.3.6	Perform leakage rate testing for 36 inch high volume purge valves with resilient seals.	184 days AND Within 92 days after opening the valve

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.3.76	Verify each automatic containment isolation valve that is not locked, sealed or otherwise secured in position, actuates to the isolation position on an actual or simulated actuation signal.	[24 months OR In accordance with the Surveillance Frequency Control Program]

The DCD Chapter 16, TS 3.6.3 BASES will be revised as follows:

BASES

ACTIONS (continued)

D.1, D.2 and D.3

In the event one or more containment high volume purge valves in one or more penetration flow paths are not within the high volume purge valve leakage limits, purge valve leakage must be restored to within limits, or the affected penetration flow path must be isolated. The method of isolation must be by the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic valve, closed manual valve, or blind flange. A high volume purge valve with resilient seals utilized to satisfy Required Action D.1 must have been demonstrated to meet the leakage requirements of SR 3.6.3.6. The specified Completion Time is reasonable, considering that one high volume purge valve remains closed so that a gross breach of containment does not exist.

In accordance with Required Action D.2, this penetration flow path must be verified to be isolated on a periodic basis. The periodic verification is necessary to ensure that containment penetrations required to be isolated following an accident, which are no longer capable of being automatically isolated, will be in the isolation position should an event occur. This Required Action does not require any testing or valve manipulation. Rather, it involves verification that those isolation devices outside containment capable of being mispositioned are in the correct position. For the isolation devices inside containment, the time period specified as "prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days" is based on engineering judgment and is considered reasonable in view of the inaccessibility of the isolation devices and other administrative controls that will ensure that isolation device misalignment is an unlikely possibility.

For the containment high volume purge valve with resilient seal that is isolated in accordance with Required Action D.1, SR 3.6.3.6 must be performed at least once every 92 days. This assures that degradation of the resilient seal is detected and confirms that the leakage rate of the containment high volume purge valve does not increase during the time

the penetration is isolated. The normal Frequency for SR 3.6.3.6, 184 days, is based on an NRC initiative, Generic Issue B-20 (Ref. 4). Since more reliance is placed on a single valve while in this Condition, it is prudent to perform the SR more often. Therefore, a Frequency of once per 92 days was chosen and has been shown to be acceptable based on operating experience.

Required Action D.2 is modified by two Notes. Note 1 applies to isolation devices located in high radiation areas and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted. Note 2 applies to isolation devices that are locked, sealed, or otherwise secured in position and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since the function of locking, sealing, or securing components is to ensure that these devices are not inadvertently repositioned.

BASES

ACTIONS (continued)

E.1 and E.2 ~~D.1 and D.2~~

If the Required Actions and associated Completion Times are not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.6.3.1

Each 36 inch containment high volume purge valve is required to be verified sealed closed. This Surveillance is designed to ensure that a gross breach of containment is not caused by an inadvertent or spurious opening of a containment high volume purge valve. Detailed analysis conducted for similar plant design of the purge valves failed to conclusively demonstrate their ability to close during a LOCA in time to limit offsite doses. Therefore, these valves are required to be in the sealed closed position during MODES 1, 2, 3, and 4. A containment high volume purge valve that is sealed closed must have motive power to the valve operator removed. This can be accomplished by de-energizing the source of electric power or by removing the air supply to the valve operator. In this application, the term "sealed" has no connotation of leak tightness. [The Frequency of 31 days is a result of an NRC initiative, Generic Issue B-24 (Ref. 54), related to containment purge valve use during plant operations. In the event purge valve leakage requires entry into Condition D~~E~~, the Surveillance permits opening one purge valve in a penetration flow path to perform repairs. OR The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.]

BASES

SURVEILLANCE REQUIREMENTS

SR 3.6.3.6

For containment purge valves with resilient seals, additional leakage rate testing beyond the test requirements of 10 CFR 50, Appendix J, Option B, is required to ensure OPERABILITY. Operating experience has demonstrated that this type of seal has the potential to degrade in a shorter time period than do other seal types. Based on this observation and the importance of maintaining this penetration leak tight (due to the direct path between containment and the environment), a Frequency of 184 days was established as part of the NRC resolution of Generic Issue B-20, "Containment Leakage Due to Seal Deterioration" (Ref. 4).

Additionally, this SR must be performed within 92 days after opening the valve. The 92 day Frequency was chosen recognizing that cycling the valve could introduce additional seal degradation (beyond that occurring to a valve that has not been opened). Thus, decreasing the interval (from 184 days) is a prudent measure after a valve has been opened.

SR 3.6.3.7 ~~SR 3.6.3.6~~

Automatic containment isolation valves close on a containment isolation signal to prevent leakage of radioactive material from containment following a DBA. This SR ensures that each automatic containment isolation valve will actuate to its isolation position on a containment isolation signal. This surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

REFERENCES

4. Generic Issue B-20, "Containment Leakage Due to Seal Deterioration."

5. Generic Issue B-24.

Impact on COLA

There is impact on the COLA to incorporate the DCD change.

Impact on PRA

There is no impact on the PRA.

2/4/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 136-1819 REVISION 0**
SRP SECTION:	**16 - TECHNICAL SPECIFICATIONS**
APPLICATION SECTION:	**TS SECTION 3.6**
DATE OF RAI ISSUE:	**12/22/2008**

QUESTION NO.: 16-61

TS 3.6.3, Containment Isolation Valves.

Provide the additional information to explain inconsistencies between the APWR TS bases and the APWR FSAR regarding the containment isolation valve closing times. Revise the APWR TS bases B 3.6.3, as appropriate.

The APWR bases B 3.6.3, Applicable Safety Analyses section, third paragraph (Page B 3.6.3-3) states "the DBA analysis assumes that, within 15 seconds after the accident, isolation of the containment is complete and leakage terminated except for the design leakage rate, La. The containment isolation total response time of 15 seconds includes signal delay, and containment isolation valve stroke times." This 15-second total closing time is not consitent with valve closing times provided in the APWR FSAR Table 6.2.4-3 (e.g. the closing time for CVCS valves CVS-AOV-005 is 20 seconds). In addition, the emergency diesel generator start up (for loss of offsite power) should also be accounted for in the total response time as suggested in the Westinghouse STS bases B 3.6.3.

ANSWER:

The containment isolation total response time of 15 seconds after the accident is for valves of the containment purge system and not for all containment isolation valves. Containment isolation is completed within 60 seconds.

Impact on DCD

The description of TS B 3.6.3, APPLICABLE SAFETY ANALYSES, 3rd paragraph will be revised as indicated below.

> The DBA analysis assumes that, within ~~15~~60 seconds after the accident, isolation of the containment is complete and leakage terminated except for the design leakage rate, La. The containment isolation total response time of ~~15~~60 seconds includes signal delay, and containment isolation valve stroke times.
>
> The single failure criterion required to be imposed in the conduct of plant safety analyses was considered in the original design of the containment purge valves. Two valves in series on each purge line provide assurance that both the supply and exhaust lines could be isolated even if a single failure occurred.

Impact on COLA

There are impacts on the COLA to incorporate the DCD change.

Impact on PRA

There is no impact on the PRA.

2/4/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

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QUESTION NO.: 16-62

TS 3.6.4, Containment Pressure.

Justify not allowing any margin for the minimum pressure inside containment to reach the design load of -3.9 psig during the inadvertent actuation of the Containment Spray System event.

The APWR TS bases B 3.6.4, Applicable Safety Analyses, third paragraph states "the containment was also designed for an external pressure load equivalent to -3.9 psig. The inadvertent actuation of the Containment Spray System was analysed to determine the resulting reduction in containment pressure. The initial pressure condition used in this analysis was -0.3 psig. This resulted in a minimum pressure inside containment of - 3.9 psig, which equal to the design load. APWR TS should establish limits for operating parameter such as the containment pressure to ensure some margin is reserved as indicated in a comparable discussion in the Westinghouse STS bases B 3.6.4.

This information is needed to ensure adequacy of APWR TS 3.6.4 requirements.

ANSWER:

The discussion about containment external pressure is described in DCD Subsection 6.2.1.1.3.5, External Pressure Analysis. In this analysis for external pressure, the following initial conditions were assumed:

a. The air temperature inside PCCV is initially at 120°F, which maximizes the temperature differential between the containment atmosphere and the spray, which is at a temperature of 32°F
b. The PCCV pressure is at -0.3 psig
c. The relative humidity is at a maximum value of 100%

So, there is an enough margin for containment external pressure by taking these conditions into account.

Impact on DCD

There is no impact on the DCD.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

2/4/2009

US-APWR Design Certification

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QUESTION NO.: 16-63

TS 3.6.6, Containment Spray (CS) System.

Provide a discussion in the Bases for adding a note just before the Applicability statement in US-APWR LCO 3.6.6, stating "CS train may be considered OPERABLE during alignment and operation for decay heat removal as RHRS if capable of being manually realigned to the CS mode of operation".

ANSWER:

The reason for adding the note in US-APWR LCO 3.6.6 is that containment spray pumps and heat exchangers are used for RHR functions during shutdown. The following sentences will be added in the BASES 3.6.6 LCO.

"This LCO is modified by a Note that allows an RHR train to be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned (remote or local) to the CS mode of operation and not otherwise inoperable. This allows operation in the RHR mode during MODE 4."

In STS LCO 3.5.3 of NUREG-1431, there is a note that allows an RHR train to be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned (remote or local) to the ECCS mode of operation and not otherwise inoperable. This note is for the plant that LHSI are used for RHR functions during shutdown. The intent for adding the note in US-APWR LCO 3.6.6 is the same as this.

Impact on DCD

The TS 3.6.6 BASES, LCO will be revised to add the following paragraph after last paragraph.

This LCO is modified by a Note that allows an RHR train to be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned (remote or local) to the CS mode of operation and not otherwise inoperable. This allows operation in the RHR mode during MODE 4.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

2/4/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 136-1819 REVISION 0**
SRP SECTION:	**16 - TECHNICAL SPECIFICATIONS**
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QUESTION NO.: 16-64

TS 3.6.6, Containment Spray System.

Justify the selected Completion Times of 7 days for Required Actions A.1 and A.2, and 72 hours for Required Action B.1.

APWR Action Statements for LCO 3.6.6 were formulated using descriptive texts and completion times established in the Westinghouse STS 3.6.6B. However, in the Westinghouse design, the Containment Spray System together with the Containment Air Cooling System provides more redundant cooling capacity than required to cover a worst case single active failure. There is no safety-grade Containment Air Cooling System in the APWR design. Therefore, for Condition A, with one CS train inoperable, a single failure cannot be afforded to fulfill the system safety function, and a Completion Time of 72 hours would be appropriate. The Condition B, with less than two trains operable, was not analyzed in the plant accident analyses, and LCO 3.0.3 should have been evoked.

This information is needed to ensure adequacy of APWR TS 3.6.6 requirements

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ANSWER:

The following mistakes will be corrected.

1. The COMPLETION TIME of REQUIRED ACTION A.1 and A.2 will be corrected from 7 days to 72 hours.

2. The column, CONDITION B. (One or less Required containment spray trains OPERABLE) will be deleted.

3. CONDITION "C" will be corrected to CONDITION "B". Also, REQUIRED ACTION "C.1, C.2" will be corrected to REQUIRED ACTION "B.1, B.2".

4. BASES for ACTIONS A.1 [and A.2], the first sentence, "If one of the required containment spray trains is inoperable, it must be restored to OPERABLE status within 7days." will be replaced with "If one of the required containment spray trains is inoperable, it must be restored to OPERABLE status within 72 hours."

5. BASES for ACTIONS A.1 [and A.2], the last sentence, "The 7 day Completion Time was chosen because of the low probability of DBA occurring during this period." will be replaced with "The 72

hours Completion Time was chosen because of the low probability of DBA occurring during this period."

6. B.1 of BASES for ACTIONS will be deleted.

7. "C.1 and C.2" of BASES for ACTIONS will be replaced with "B.1 and B.2."

8. BASES for ACTIONS C.1 and C.2, the first sentence, "If any of the Requirement Actions or associated Completion Times for Condition A or B of this LCO are not met,...." will be replaced with "If any of the Requirement Actions or associated Completion Times for Condition A of this LCO are not met,...."

Impact on DCD

The DCD Chapter 16, TS 3.6.6 ACTIONS will be revised as follows:

CONDITION	REQUIED ACTION	COMPLETION TIME
A. One required containment spray train inoperable.	A.1 Restore three containment spray trains to OPERABLE status. [OR A.2 ----------NOTES---------- This Required Action is not applicable in MODE 4. ---------- Apply the requirements of Specification 5.5.18	72 hours ~~7 days~~ 72 hours ~~7 days~~]
~~B. One or less required containment spray trains OPERABLE.~~	~~B.1 Restore two containment spray trains to OPERABLE status.~~	~~72 hours~~
BC. Required Action and associated Completion Time of Condition A or B not met.	BC.1 Be in MODE 3. AND BC.2 Be in MODE 5.	6 hours 36 hours

The DCD Chapter 16, TS 3.6.6 BASES, ACTIONS will be revised as follows:

A.1 [and A.2]
If one of the required containment spray trains is inoperable, it must be restored to OPERABLE status within 72 hours ~~7 days~~. With a required containment spray train inoperable, the system is capable of providing 100% of the heat removal needs for a DBA . [Required Action A.2 allows the option to apply the requirements of Specification 5.5.18 to determine a risk informed completion time (RICT). This Required Action is not applicable in MODE 4.] The 72 hours ~~7 day~~ Completion Time was chosen because of the low probability of DBA occurring during this period.

~~B.1~~
~~With one or less containment spray trains OPERABLE, the containment spray system is not capable of providing 100% capacity. Therefore, two trains must be restored to OPERABLE status within 72 hours. The 72 hour Completion Time was chosen as a reasonable time for repairs and low probability of DBA occurring during this period.~~

BC.1 and BC.2

If any of the Required Actions or associated Completion Times for Condition A ~~or B~~ of this LCO are not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

Impact on COLA

There are impacts on the COLA to incorporate the DCD change.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

2/4/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 136-1819 REVISION 0**
SRP SECTION:	**16 - TECHNICAL SPECIFICATIONS**
APPLICATION SECTION:	**TS SECTION 3.6**
DATE OF RAI ISSUE:	**12/22/2008**

QUESTION NO.: 16-65

TS B 3.6.6, Containment Spray System.

Clarify the statements in the Bases B 3.6.6, Background section, Fifth Paragraph "heat is removed from the containment sump water by the residual heat removal coolers," and Sixth Paragraph "operation of the Containment Spray System in the recirculation mode is controlled by the operator in accordance with the emergency operating procedures."

These texts are repeats of the texts in STS Bases B 3.6.6B. However, in the Westinghouse design, the suction of the CS pump is switched over from the Refueling Water Storage Tank to the Containment Sump during the recirculating phase. In the APWR design, the RWST is inside the Containment and the CS pump does not take suction from the Containment Sump.

This is needed to ensure accurate information is provided in the TS bases.

ANSWER:

The following mistakes will be corrected.

1. BASES B 3.6.6, Background section, the fifth paragraph, the first sentence, "Heat is removed from the containment sump water by the residual heat removal coolers." will be replaced with "Heat is removed from the RWSP water by the containment spray/residual heat removal heat exchangers."

2. BASES B 3.6.6, Background section, the last paragraph, the last sentence, "Operation of the Containment Spray System in the recirculation mode is controlled by the operator in accordance with the emergency operating procedures." will be deleted.

Impact on DCD

The DCD Chapter 16, TS 3.6.6 BASES, Background, 5th paragraph will be revised as follows:

> Heat is removed from the RWSP ~~containment sump~~ water by the containment spray/residual heat removal heat exchangers ~~coolers~~. Two trains of the Containment Spray System provide adequate spray coverage to meet the system design requirements for containment heat removal.

The DCD Chapter 16, TS 3.6.6 BASES, Background, last paragraph will be revised as follows:

The Containment Spray System is actuated either automatically by a High-3 containment pressure signal or manually. An automatic actuation opens the containment spray pump discharge valves and starts the containment spray pumps. A manual actuation of the Containment Spray System requires the operator to actuate two separate switches on the main control board to begin the same sequence. The Containment Spray System maintains an equilibrium temperature between the containment atmosphere and RWSP water. ~~Operation of the Containment Spray System in the recirculation mode is controlled by the operator in accordance with the emergency operating procedures.~~

Impact on COLA

There are impacts on the COLA to incorporate the DCD change.

Impact on PRA

There is no impact on the PRA.