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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-09521

Subject: **Update of Chapter 9 of US-APWR DCD**

Reference:
1) CP-200801264 Log # TXNB-08024 from M. L. Lucas (Luminant) to U.S. NRC,"COMBINED LICENSE APPLICATION FOR COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 3 AND 4 PROJECT NO. 0754" dated September 19, 2008
2) Letter MHI Ref: UAP-HF-09490 from Y. Ogata (MHI) to U.S. NRC, "Submittal of US-APWR Design Control Document Revision 2 in Support of Mitsubishi Heavy Industries, Ltd.'s Application for Design Certification of the US-APWR Standard Plant Design" dated October 27, 2009.
3) NRC Request for Additional Information No. 3698 Revision 0, RAI #109, 10/2/2009, Comanche Peak Units 3 and 4, Luminant Generation Company, LLC. Docket No. 52-034 and 52-035, SRP Section: 09.02.01 – Station Service Water, Application Section: 9.2.1

During the review process of the Combined License Application for Comanche Peak Units 3 and 4("R-COLA", Reference 1), which incorporates by reference the Mitsubishi Heavy Industries, Ltd.("MHI") Design Certification Application for the US-APWR Standard Plant Design ("DCD", Reference 2), the U.S. Nuclear Regulatory Commission("NRC") Staff has requested additional information about the ESWS (Reference 3).

Based on our response to this RAI, updates of Chapter 9 of our US-APWR Design Control Document are required.

With this letter, MHI transmits to the NRC Staff the proposed updates to be made to the DCD based on our response to this RAI. These updates will be incorporated into future DCD revisions.

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

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NRO

Sincerely,

Y. Ogata

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

Enclosure:

1. Update of Chapter 3 of the US-APWR DCD

CC: J. A. Ciocco
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Enclosure 1

UAP-HF-09521
Docket No. 52-021

Update of Chapter 9 of US-APWR DCD

November 2009

Mitsubishi received an NRC Request for Additional Information No. 3698 (CP RAI#109), dated 10/2/2009.

In response to the above RAI #109, it became necessary to revise Chapter 9 of our US-APWR Design Control Document.

Table 1 shows the change list for Chapter 9 of the DCD, which gives the positions, the contents and the reasons of changing DCD. Mark-up drafts of the DCD are also attached to this document.

Table 1 Change List of Chapter 9 of DCD

Page	Location (e.g., subsection with paragraph/ sentence/ item, table with row/column, or figure)	Description of Change
9.2-2	Subsection 9.2.1.1.2	Addition of the description of the essential service water system (ESWS) being a possible backup source for the fire protection water supply system (FSS).
9.2-4; 9.2-10; 9.2-50	Subsections 9.2.1.2.2.1, 9.2.1.5.4, and 9.2.10	Deletion of the specified mode of cooling of the ESWS pump motor, i.e. thru water cooling. In lieu, this will be identified as site specific and will be added to COL item 9.2(6).

- described in Section 3.5; protection against dynamic effects associated with the postulated rupture of piping as described in Section 3.6. Environmental qualification of Class 1E equipment is described in Section 3.11; seismic design is described in Section 3.7, and fire protection is described in Section 9.5.

- The ESWS is constructed in accordance with ASME Section III, Class 3 requirements.

- The ESWS is designed forto permit periodic inservice testing and inspection of components to assure system integrity and capability in accordance with GDC 45 and ASME Code Section XI.

- The ESWS is designed to permit appropriate pressure and functional testing to assure the structural and leaktight integrity of components, operability and the performance of the active components of the system, and system operability during reactor shutdown, loss-of-coolant accidents, including operation of applicable portions of the protection system and the transfer between normal and emergency power sources per GDC 46.

- The ESWS is designed with the capability to isolate non–safety related portion.

- The essential service water pumps (ESWPs) are designed to have sufficient available net positive suction head to assure that they can perform their safety function at the lowest probable water level of the UHS.

9.2.1.1.2 Power Generation Design Bases

The ESWS is designed to provide cooling water to the plant components and transfer heat to the UHS during all modes of normal operation. The ESWS does not provide cooling water to any nonsafety-related components during normal plant operations or design basis LOCA conditions. ESWS may be used as a backup source of water to the fire protection water supply system (FSS) in the event the normal supply is unavailable due to earthquake. The ESWS is normally isolated from the FSS. The ESWS is not required to supply water to the FSS during any design basis event other than the safe shutdown earthquake. ~~However, s~~Some portions of the system are nonsafety-related, e. g., sections of pipe in heat exchanger drains piping after the isolation valves. These boundary isolation valves which provide separation between the safety-related and nonsafety-related portions are normally closed. During a design basis event, postulated simultaneous failure of all nonsafety-related piping would not impact operation of any ESW train and would not affect ESWS capability to perform its safety functions. The COL aApplicant is to address site specific nonsafety-related system isolation (intake basin blow down system, intake basin make up water system, FSS) as applicable.

9.2.1.2 System Description

9.2.1.2.1 General Description

Figure 9.2.1-1 shows the piping and instrumentation diagram of the ESWS. The ESWS draws water from the intake basin and returns water to the UHS after passing through the CCW HXs and the essential chiller units. The UHS is the source of water to the

9.2.5. Type and location of UHS is site specific. The COL Applicant is to assure that selection and design of the UHS supplies water to the ESWS at a maximum temperature of 95 F under all operating conditions to assure sufficient cooling capacity. The UHS design also assures the cooling water inventory for a minimum of 30 days without make-up to mitigate the consequences of a design basis event. The COL Applicant is to design ESW intake structure or UHS basin such that minimum water level (after 30 day operation) will provide adequate NPSH to ESWPs under accident conditions.

Bio-fouling and chemistry control of the ESWS is site specific and depends upon the type of UHS. The COL Applicant is to specify the following ESW chemistry requirements.

- A chemical injection system to provide non-corrosive, non-scale forming conditions to limit biological film formation
- The type of biocide, algaecide, pH adjuster, corrosion inhibitor, scale inhibitor and silt dispersant based on the site conditions

The COL Applicant is to develop operating procedures to verify system layout and performance to assure that the ESW is above saturation conditions throughout the system.

The COL applicant is to develop maintenance and test procedures to monitor debris build up and flush out debris.

The COL Applicant is to provide the piping, valves and other design related to the site specific UHS.

9.2.1.1.2 Component Description

Table 9.2.1-1 shows the design parameters of the major components in the system.

9.2.1.2.2.1 ESWPs

Four 50% capacity ESWPs, one per train, supply cooling water to remove heat from the components, and then discharge to the UHS.

The pumps are powered from the Class 1E normal ac power system. On loss of offsite power, the pumps are automatically powered from their respective emergency power source.

Each pump is designed to provide 13,000 gpm flow at the required total dynamic head. The COL Applicant is to provide the site specific data for the ESWPs and assure that the selected ESWP will require less NPSH than the minimum available NPSH under all operating conditions.

The ~~ESWP motors are water cooled~~ mode of cooling of the ESWP motors is site-specific and shall be determined by the COL Applicant.

9.2.1.2.2.2 Strainers

The ESWS is hydrostatically tested prior to initial startup. Preoperational testing is described in Section 14.2. System performance during normal operation is verified by monitoring system pressures, temperatures and flows.

Inservice inspection and testing of piping is performed in accordance with the requirements of ASME Section XI, as discussed in section 6.6.

Inservice testing of active pumps and valves is performed to assure operational readiness, as described in subsection 3.9.6.

The periodic performance verification of the ESWS components, including the heat exchanger which is cooled by the ESW, is performed to detect performance degradation due to fouling.

9.2.1.5 Instrumentation Requirements

The operator has functional control and monitoring capability of the ESWS in the MCR and also at the remote shutdown room (RSR). All functions described below that are available in the MCR are also available at the RSR.

9.2.1.5.1 ESWS discharge pressure

The ESWP discharge pressure is locally indicated, and pressure readings are used for ESWP performance testing.

9.2.1.5.2 ESW header line pressure

ESW header pressure is indicated in the MCR. When the pressure decreases due to the failure or inadvertent shutdown of the operating pump or valve misalignment, a low pressure alarm is transmitted to the MCR.

9.2.1.5.3 CCW HX essential service water flow

The flow rate is indicated in the MCR. A low flow alarm is transmitted to the MCR.

9.2.1.5.4 ESWP motor essential service water flow

~~The flow rate is indicated in the MCR. A low flow alarm is transmitted to the MCR.~~ Deleted.

9.2.1.5.5 Differential pressure of strainer

Differential pressure of strainers located in each ESWP discharge line is indicated in the MCR. High differential pressure alarm is transmitted to the MCR. Differential pressure of CCW HX inlet strainer is locally indicated.

9.2.1.5.6 Radiation monitor

COL 9.2(5) *The COL Applicant is to determine location and design of the ESW discharge structure.*

COL 9.2(6) *The COL Applicant is to provide ESWP design details – required total dynamic head, NPSH available, ~~etc~~ and the mode of cooling of the ESWP.*

COL 9.2(7) *The COL Applicant is to provide the piping, valves, including those at the boundary between the safety-related and nonsafety-related portions, and other design of the ESWS related to the site specific conditions, including the safety evaluation.*

COL 9.2(8) *The COL Applicant is to specify the following ESW chemistry requirements:*

- *A chemical injection system to provide non-corrosive, non-scale forming conditions to limit biological film formation.*
- *Type of biocide, algaecide, pH adjuster, corrosion inhibitor, scale inhibitor and silt dispersant based on the site conditions.*

COL 9.2(9) *COL Applicant is to confirm the storage capacity and usage of the potable water.*

COL 9.2(10) *COL Applicant is to confirm that all State and Local Department of Health and Environmental Protection Standards are applied and followed.*

COL 9.2(11) *The COL Applicant is to confirm the source of potable water to the site and the necessary required treatment.*

COL 9.2(12) *COL Applicant is to confirm that the sanitary waste is sent to the onsite plant treatment area or they will use the city sewage system.*

COL 9.2(13) *COL Applicant is to identify the potable water supply and describe the system operation.*

COL 9.2(14) *COL Applicant is to confirm Table 9.2.4-1 for required components and their values.*

COL 9.2(15) *The COL Applicant is to determine the total number of people at the site and identify the usage capacity. Based on these numbers the COL Applicant is to size the potable water tank and associated pumps.*

COL 9.2(16) *The COL Applicant is to provide values to the component Table 9.2.4-1 based on system and component descriptions from Section 9.2.4.2.1 and 9.2.4.2.2 respectively.*

COL 9.2(17) *The COL Applicant is to determine the total number of sanitary lift stations and is to size the appropriate interfaces.*