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UniStar
NUCLEAR ENERGY

10 CFR 50.4
10 CFR 52.79

December 20, 2012

UN#12-154

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: UniStar Nuclear Energy, NRC Docket No. 52-016
Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3,
RAI 332, Ultimate Heat Sink

References:
1) Surinder Arora (NRC) to Paul Infanger (UniStar Nuclear Energy), "Final RAI 332 SBPA 6228," email dated January 20, 2012

2) UniStar Nuclear Energy Letter UN#12-044, from Mark T. Finley to Document Control Desk, U.S. NRC, Response to Requests for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3, RAI 325, Information Systems Important to Safety: RAI 325, Information Systems Important to Safety, RAI 328, Flooding Protection Requirements, RAIs 287, 330, RAI 331, RAI 332, RAI 336, Ultimate Heat Sink, RAIs 333, 339, Other Seismic Category I Structures, RAI 337, Initial Plant Test Program - Design Certification and New License Applicants, and RAI 340, Functional Design Qualification and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints, dated May 18, 2012

The purpose of this letter is to respond to the request for additional information (RAI) identified in the NRC e-mail correspondence to UniStar Nuclear Energy, dated January 20, 2012 (Reference 1). This RAI addresses the Ultimate Heat Sink, as discussed in Section 9.2.5 of the

D096
NRO

Final Safety Analysis Report (FSAR), as submitted in Part 2 of the Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 3 Combined License Application (COLA), Revision 8.

Reference 2 indicated that a response to RAI 332, Question 09.02.05-22 would be provided to the NRC by December 20, 2012. Enclosure 1 provides our response to RAI 332, Question 09.02.05-22, and includes revised COLA content. Enclosure 2 provides the COLA impact of the response to RAI 332, Question 09.02.05-22. A Licensing Basis Document Change Request has been initiated to incorporate these changes into a future revision of the COLA. Enclosure 3 provides a table of changes to the CCNPP Unit 3 COLA associated with the RAI 332 response. As identified in the Enclosure 3 table of changes, this response modifies previously submitted responses to RAI 182, Question 03.02.02-1, RAI 286, Question 09.02.05-18, RAI 279, Question 09.02.05-7, RAI 277, Question 09.02.01-1, and RAI 340, Question 03.09.06-4.

Our response does not include any new regulatory commitments. This letter does not contain any sensitive or proprietary information.

If there are any questions regarding this transmittal, please contact me at (410) 369-1907 or Mr. Wayne A. Massie at (410) 369-1910.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on December 20, 2012

Mark T. Finley

Enclosures:

1) Response to NRC Request for Additional Information, RAI 332, Question 09.02.05-22, Ultimate Heat Sink, Calvert Cliffs Nuclear Power Plant, Unit 3

2) Changes to CCNPP Unit 3 COLA Associated with the Response to RAI 332, Question 09.02.05-22, Calvert Cliffs Nuclear Power Plant, Unit 3

3) Table of Changes to CCNPP Unit 3 COLA Associated with the Response to RAI 332, Question 09.02.05-22, Calvert Cliffs Nuclear Power Plant, Unit 3

cc: Surinder Arora, NRC Project Manager, U.S. EPR Projects Branch
Laura Quinn-Willingham, NRC Environmental Project Manager, U.S. EPR COL Application
Amy Snyder, NRC Project Manager, U.S. EPR DC Application, (w/o enclosures)
Patricia Holahan, Acting Deputy Regional Administrator, NRC Region II, (w/o enclosures)
Silas Kennedy, U.S. NRC Resident Inspector, CCNPP, Units 1 and 2,
David Lew, Deputy Regional Administrator, NRC Region I (w/o enclosures)

Enclosure 1

Response to NRC Request for Additional Information,
RAI 332, Question 09.02.05-22,
Ultimate Heat Sink,
Calvert Cliffs Nuclear Power Plant, Unit 3

RAI No 332

Question 09.02.05-22

Follow-up to RAI 279, Question 09.02.05-10

The staff understands the reason for a layup program for the UHS makeup water system and understands that it is undesirable to leave a safety-related water system in a filled, no flow status since it is only used after a DBA and only during testing, once every 24 months. However, a system drain followed by a dry layup may not be the best approach since EPRI NP-5106, "Sourcebook for Plant Layup and Equipment Preservation," suggests there are other means of layup including circulation, dry layup with air drying and dry air with dehumidified. The preferred layup method for cooling water system, see table 5-5 and 5-6 of this EPRI sourcebook, was to maintain system circulation. Relative humidity (RH) should be controlled for dry layup between 30 to 40 % and the applicant did not specifically address the layup conditions related to RH in the RAI response. The RAI response is also not clear that the low point drains remain open during the dry layup conditions in which humidity and contaminates may enter the piping system. In addition, for the system fill, it is not clear that the closing/opening of the valves is by MCR operator, operator in the field, or operator at a local control panel. Also it is not clear the exact location of the safety classification for the drain and vent valves since they are not shown on any of the FSAR figures.

The applicant should address the following items:

1. Discuss in the RAI response your complete review and analysis of the layup method using the material that is to be used in the piping system.

2. Discuss the selection process given that in EPRI NP-5106, the preferred layup may not be 'drained'. Clarify in the CCNPP Unit 3 application the piping materials since between Revision 7 of the FSAR, RAI responses, and ITAAC it varies between carbon steel, super austenitic steel, carbon steel with rubber lining, or SB-675SS.

3. Discuss in the RAI response your justification for a 24 month testing of the UHS makeup water system given the importance to safety classification post DBA.

4. Discuss in the RAI response your analysis to call the UHS makeup system "operable" knowing that operator actions will be required to restore the UHS makeup system since the system is drained and requires filling to provide water to the UHS basins.

5. Discuss in the RAI response that the filling of the UHS makeup water system is not considered as pre-condition before performing the Technical Specification surveillance. Describe the procedure for performing the surveillance, for example confirm that the procedures include the testing of the operator's ability to fill the piping system in a timely manner. Confirm that the surveillance procedures consider the potential for operator error, such as improper valve sequencing/manipulation in filling the UHS makeup water system.

6. Clarify in the FSAR the valve positions and locations on an FSAR Figure, of the UHS makeup water system vent and drain valves to support the layup program and if these valves are open, describe the controls in place to maintain the system cleanliness. Describe in the FSAR the operator actions needed to close open valves.

Response

At a public meeting on May 3, 2012, UniStar made a presentation to the NRC indicating its intent to pursue the following approach for Calvert Cliffs Nuclear Power Plant Unit 3 (CCNPP Unit 3) Ultimate Heat Sink (UHS) Makeup Water System.

A. Changing the UHS Makeup Water screen wash system from Non Safety-Related (NSR) to Safety-Related.
B. Eliminate the UHS Makeup Water screen wash pumps and provide wash water to the screens from the safety-related UHS Makeup Water pumps.
C. Changing the UHS Makeup Water System from a dry layup system to a wet layup system.
D. Performing the UHS Makeup Water System functional test and flushing the entire UHS Makeup Water System piping every three months (quarterly).
E. Adding a new Limiting Condition for Operation (LCO) for the required number of operable UHS Makeup Water System trains to site-specific Technical Specifications (TS).
F. Adding a new Surveillance Requirement (SR) to verify the proper operation of traveling screens and screen wash system and forebay level to site-specific TS.
G. Providing UHS Makeup Water traveling screen motor and pump discharge strainer motor status and heat tracing alarm.
H. Verifying that the Instrumentation and Controls (I&C) signals that trip the UHS Makeup Water pumps are safety-related signals.
I. Adding an ITAAC to verify UHS Makeup Water System water temperature does not exceed 95°F.
J. Changing operation of the traveling screens and screen wash system to eliminate local manual actions.
K. Clarifying that the UHS Makeup Water System operation is manually initiated by the operator from the Main Control Room based on UHS cooling tower basin level
L. Changing the UHS Makeup Water traveling screens and screen wash system to Seismic Category I to comply with General Design Criterion (GDC) 2
M. Including the UHS Makeup Water System traveling screens and screen wash system as part of the Reliability Assurance Program and Maintenance Rule
N. Incorporating frequent rotation and cleaning of the UHS Makeup Water traveling screens into the FSAR
O. Providing heating to the UHS Makeup Water Intake Structure (MWIS) Traveling Screen room to maintain the temperature at or above 41°F, to mitigate icing effects

Items A, B, J, L, M, N, and O are discussed in RAI 330 Question 09.02.05-20 response UN#12-153.
Items C and D are discussed in RAI 332 Question 09.02.05-22 response UN#12-154.
Items E and F are discussed in RAI 336 Question 09.02.05-23 response UN#12-156.
Items G and H are discussed in RAI 336 Question 09.02.05-24 response UN#12-156 and RAI 325 Question 07.05-1 response UN#12-151.
Item G is discussed in RAI 337 Question 14.02-58 response UN#12-157.
Item I is discussed in RAI 336 Question 09.02.05-27 response UN#12-156.
Item K is discussed in RAI 325 Question 07.05-1 response UN#12-151.

All of the above responses were submitted December 20, 2012.

1. The UHS Makeup Water safety-related SSCs are designed in accordance with ASME Section III, Class 3, and Seismic Category 1 requirements, including the UHS Makeup Keep-Fill line and the Post-Design Basis Accident (DBA) UHS Makeup Keep-Fill line, which are located in the Essential Service Water System (ESWS) pump house. The UHS Makeup Water System is designed to provide a backup source of makeup water to the UHS cooling tower basin 72 hours post accident and beyond, when the normal source of makeup water is not available. The UHS Makeup Water System is also designed to operate during system performance and functional testing every three months.

   The UHS Makeup Keep-Fill line and Post-DBA UHS Makeup Keep-Fill lines are designed to provide makeup water to keep the UHS Makeup Water System full at all times. The UHS Makeup Keep-Fill line delivers desalinated makeup water from the site-specific nonsafety-related normal makeup water system through a safety-related manual isolation valve and safety-related check valve to the safety-related UHS Makeup Water System. This is to maintain the system full due to valve leakage during plant normal operation. Material of piping, fittings, and valves in this line is super austenitic stainless steel. The Post-DBA UHS Makeup Keep-Fill line delivers water from the safety-related ESWS return line through a safety-related manual isolation valve, safety-related check valve, and flow restricting orifice to the UHS Makeup Water System, to maintain the system full due to leakage during post DBA operating condition. Material of piping, fittings, valves, and orifice in this line is super austenitic stainless steel. CCNPP Unit 3 FSAR Figure 9.2-3 (Normal Makeup, UHS Makeup, and Blowdown) is updated to reflect the new configuration. Also, new FSAR Figure 9.2-10 (ESWS Emergency Makeup Water System Piping and Instrumentation Diagram) and Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Figure 2.4-3 (ESWS Emergency Makeup Water System Functional Arrangement) have been added to the COLA.

   The UHS Makeup Water System is normally in a state of wet layup and the closed boundary isolation valves are relied upon to prevent any system drain-down. The permissible valve or system leakage rate will be specified by the plant owner for a specific valve or valve combination.

   The site-specific normal makeup water system provides a maximum of 627 gpm (2373 lpm) of desalinated water to replenish ESWS basin inventory losses due to evaporation, blowdown, and drift, and also provides makeup water to the UHS Makeup Water System to maintain the system line full at all times during normal shutdown/cooldown condition. Since the normal makeup pump capacity has significant margin, flow through the UHS Makeup Keep-Fill line, due to boundary valve leakage, is inconsequential. The safety-related ESW System pump provides a maximum of 19,340 gpm (73,210 lpm) to the Component Cooling Water System (CCWS) heat exchanger, diesel generators heat exchangers, and ESW pump room ventilation Air Handling unit (AHU). Since the ESW pump capacity has significant margin, flow through the Post-DBA UHS Makeup Keep-Fill line, to maintain UHS Makeup Water System full due to leakage, is inconsequential.

   The Post-DBA UHS Makeup Keep-Fill line piping and associated manual isolation valve, check valve, and flow restricting orifice are safety-related and identified in Section 1.8.2 as a departure from the U.S. EPR FSAR. (See Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 3 Figure 9.2-3 – {Normal Makeup, UHS Makeup, and Blowdown} and

CCNPP Unit 3 Figure 9.2-10 – {UHS Makeup Water System Piping and Instrumentation}).

Additionally, in the post-DBA scenario, UHS Makeup Water pumps provide a maximum of 750 gpm of brackish makeup water from the Chesapeake Bay to the UHS cooling tower basin. The permissible valve leakage rate will be specified by the plant owner for a specific valve or valve combination. The design of the UHS Makeup Water System pump capacity considers the expected valve seat leakage for the boundary isolation valves. Since the UHS Makeup Water pump capacity has significant margin, boundary valve leakage rates are inconsequential.

Considering the wet layup of the UHS Makeup Water system during plant normal operating condition, the UHS Makeup Water System is in standby mode with the system piping initially filled with water from the Chesapeake Bay. The water in the piping is stagnant and subject to the effects of silting, erosion, corrosion, and the presence of organisms that subject the system to microbiological influenced corrosion (MIC) as well as macro fouling. Therefore, the UHS Makeup Water System piping, valves, and fittings material of construction is super austenitic stainless steel, which is compatible with the brackish water from Chesapeake Bay. Additionally, the system will be completely flushed on a quarterly basis. This will eliminate the need for a chemical treatment system of the Chesapeake Bay water in the UHS Makeup Water System during wet layup and system testing. The elimination of the chemical treatment system is further discussed in the response to RAI 330 Q09.02.05-20 (separate submittal).

The change of the UHS Makeup Water System from a dry layup system to a wet layup system will not affect the site-specific UHS Makeup Water System valves ASME OM Code Category provided in FSAR Table 3.9-2. The design of the UHS Makeup Water System periodic inspection of components necessary to maintain the integrity and capability of the system will comply with 10 CFR Appendix A, General Design Criterion (GDC)-45.

2. EPRI NP-5106 was reviewed to compare the dry layup system to the wet layup system and it is determined that the wet layup system provides the following advantages over the dry layup system.

   A. It guarantees the system readiness 72 hours post DBA.
   B. It prevents water hammer vulnerabilities during startup.
   C. It minimizes the effect of hydraulic transients upon the functional capability and the integrity of the system components during startup.
   D. It reduces operator (human) error vulnerability during system startup.

   As stated in the response to Item #1 above, the UHS Makeup Water System piping material is super austenitic stainless steel, compatible with the Chesapeake Bay brackish water. Super austenitic stainless steel piping is capable of withstanding the effect of silting, erosion, corrosion, and the presence of organisms that subject the system to microbiological influenced corrosion as well as macro fouling.

   The CCNPP Unit 3 COLA Part 2 FSAR Subsection 9.2.5.3.2 states that piping, valves, and fittings are made of super austenitic stainless steel. The COLA Part 10 ITAAC, Table 2.4-22 Item # 13, Acceptance Criteria, verifies the above ground and buried piping to be super austenitic stainless steel. The response to RAI 279, Q09.02.05-7[1] also stated that piping, valves, and fittings are made of super austenitic stainless steel. The response to RAI 279, Q09.02.05-14[2] that states the UHS Makeup Water System is a dry layup configuration and the piping is carbon steel is superseded by this RAI 332 Q09.02.05-22 response. The UHS Makeup Water System is a wet layup system and piping, valves, and fittings material is super austenitic stainless steel.

3. Inspection and testing of the UHS Makeup Water pumps is in accordance with ASME Operation and Maintenance (O&M) of Nuclear Power Plants Code Subparagraph ISTB-5220 and the test frequency is per Table ISTB 3400-1. According to the ASME O&M Code, a pump functional test will be performed quarterly to verify pump performance, with a comprehensive test biennially. During the quarterly functional pump testing for flow and pressure, the entire UHS Makeup Water System piping will be flushed through the test bypass line located in the ESW pump room. Site-specific pumps and valves Inservice Testing Program Requirements and frequency of testing is provided in CCNPP Unit 3 FSAR Table 3.9-1 and 3.9-2, respectively.

4. The UHS Makeup Water System is normally maintained in a wet layup configuration. The system is always filled with Chesapeake Bay water and maintained full in a standby mode. The UHS Makeup Keep-Fill line and Post-DBA UHS Makeup Keep-Fill line maintain the UHS Makeup Water System piping full at all times. In the event that makeup water to the UHS cooling tower basin from the UHS Makeup Water System is required, operator action will start the desired UHS Makeup Water pumps to the respective system trains as per the plant emergency operating procedures. Prior to the start of the pumps, operators ensure that there is adequate water level in the UHS Makeup Water intake structure pump bay, and traveling screens are rotated at least ¼ turn to ensure that they are available to supply necessary water flow.

5. As discussed in the response to Item #4 above, the UHS Makeup Water System dry layup configuration is changed to a wet layup configuration. Initially the system is filled with Chesapeake Bay water, tested and ready to operate. Upon the receipt of Safety Injection Signal (SIS), the normal makeup water system motor operated isolation valves and ESW system blowdown valves will be closed, the UHS Makeup Water isolation valves that may be open will be closed, and the ESWS emergency makeup water system motor operated isolation valves will be opened. An SI signal, operating procedures, and UHS cooling tower basin water level alarms will direct the operator to start the UHS Makeup Water pumps to provide the Chesapeake Bay brackish water to the UHS cooling tower basin.

   With the UHS Makeup Water System change from dry layup to wet layup standby configuration, any anticipated operator error, such as improper valve sequencing/manipulation in filling the UHS Makeup Water System piping with water (as in a dry layup system) after DBA, is reduced.

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[1] UniStar Nuclear Energy Letter UN#11-230, from Greg Gibson to Document Control Desk, U.S. NRC, Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3, RAI 279, Ultimate Heat Sink, dated August 19, 2011

[2] UniStar Nuclear Energy Letter UN#11-173, from Greg Gibson to Document Control Desk, U.S. NRC, Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3, RAI 279, Ultimate Heat Sink, dated June 3, 2011

6. As discussed in the response to Item #4 above, the UHS Makeup Water System is changed to a wet layup configuration and the system is considered operationally ready at all times, including normal plant operation when the system is in standby. The system is full with Chesapeake Bay water, tested and ready to operate from the Control Room. The design of the UHS Makeup Water piping system incorporated vents and drains. During the standby mode or during system testing, vents and drains of the UHS Makeup Water System are in a closed position. Vents and drains will operate (open or closed) only during initial and maintenance system fill-up or maintenance drain-down. The location of vents and drains in the system will be determined during detail design.

COLA Impact

Enclosure 2 provides the COLA markups associated with the response to RAI 332, Question 09.02.05-22.

Enclosure 2

Changes to CCNPP Unit 3 COLA
Associated with the Response to RAI 332, Question 09.02.05-22,
Calvert Cliffs Nuclear Power Plant, Unit 3

1.8.2 Departures

The U.S. EPR FSAR includes the following COL Item in Section 1.8.2:

> A COL applicant that references the U. S. EPR design certification will provide a list of any departures from the FSAR in the COL FSAR.

This COL Item is addressed as follows:

{The list of departures from the U.S. EPR FSAR is as follows:

Maximum Differential Settlement (across the basemat)	FSAR 2.5.4 and 3.8.5
Maximum Annual Average Atmospheric Dispersion Factor (limiting sector)	FSAR 2.3.5
Accident Atmospheric Dispersion Factor from (0 - 2 hour, Low Population Zone)	FSAR 2.3.4 and 15.0.3
In-Structure Response Spectra	FSAR 3.7.2.5.2
Shear Wave Velocity	FSAR 2.5.4.2.5.8, FSAR Table 2.0-1, and COLA Part 10, ITAAC Table 2.4-1
Coefficient of Static Friction	FSAR 3.8.5.5
Generic Technical Specifications and Bases - Setpoint Control Program	FSAR 16 (COLA Part 4)
~~Test Bypass line (piping and valve) - UHS Makeup Water system~~	~~FSAR 9.2.5~~
Post-DBA UHS Makeup Keep-Fill Line (piping, valve, and orifice) - UHS Makeup Water System	FSAR 9.2.5.5

Justification for these departures is presented in Part 7 of the COL application.}

intake structure. Makeup water to the common forebay for the Unit 3 intakes is conveyed via two buried pipes from an area adjacent to the Units 1 and 2 intake forebay formed between the existing baffle wall (acting as a skimmer wall) and a sheet pile wall extending from shore to the baffle wall. The two 60 in (1.5 m) diameter intake pipes are buried with a centerline depth at approximately -17 ft (-5.2 m). These buried pipes are safety-related structures. Four 100% capacity, vertical turbine, wet-pit UHS emergency makeup water pumps are provided to supply makeup water to the four-independent UHS cooling tower basins, one per train, with a capacity per pump of approximately 750 gpm (2835 lpm). The Forebay invert elevation is approximately at -22.5 ft (-6.9 m). The minimum design water level in the common Forebay and for the UHS makeup water pumps is set at -8 ft (-2.4 m). The available water depth of 14.5 ft (4.42 m) under the minimum design water level is sufficient to satisfy the pump submergence and Net Positive Suction Head (NPSH) requirements taking into account the pump intake head loss through screens even when the four UHS emergency makeup pumps are operating concurrently at 750 gpm (2,835 lpm).

Since the minimum design water level in the Forebay is set at -8 ft (-2.4 m) for the safety-related UHS makeup intake, the UHS makeup pumps supply sufficient water during the lowest water level due to negative surge from the PMH or tsunami (estimated at -7.7 ft (-2.34 m)). With a centerline elevation of the intake pipes at -17 ft (-5.2 m), there is no risk of vortices and air entrainment in the intake pipe.

Also, since the minimum design operating level in the bay for the nonsafety-related CWS makeup intake is set at -4.0 ft (-1.22 m), the CWS makeup pumps also supply sufficient water during the 100-year low water level (estimated at -3.9 ft (-1.19 m) in the bay. The amount of water withdrawn from the Chesapeake Bay will be subject to the state water withdrawal permit limits.

The Chesapeake Bay withdrawal permit for the cooling water of the CCNPP Unit 3 will be subject to the provisions of Title 5 of the Environment Article, Annotated Code of Maryland (MD, 2007). The EPA declared the Chesapeake Bay as an impaired water body in 1998 based on the Federal Water Pollution Control Act (USC, 2007) because of excess nutrients and sediments (CBP, 2003). Both the safety-related and non-safety-related makeup intakes comply with the Section 316(b) requirements for existing power plants of the Federal Water Pollution Control Act (USC, 2007).

The discharge flow from CCNPP Unit 3 is from a retention basin, which collects site nonradioactive wastewater and cooling tower blowdown to the Chesapeake Bay. Details of the outfall structure are provided in Section 10.4.5.

2.4.11.6 Heat Sink Dependability Requirements

The normal non-safety-related water supply to the UHS cooling tower basins is fresh water from a desalination plant (approximately 627 gpm (2,373 lpm)). The emergency safety-related water supply to the ESWS cooling tower basins is brackish water from the Chesapeake Bay from the emergency makeup water system (~~approximately 228~~ ≥ 300 gpm (~~862~~ ≥ 1,135.6 lpm) ~~maximum anticipated~~ per train). In the event normal water supply is lost, there is a 72 hour volume of water available at the tower basin to deal with system losses before the emergency UHS makeup water supply is required to be initiated.

The ESWS cooling tower basin design considers that the basin is operating just above the low operating water level at the start of an accident and that the normal non-safety-related makeup water supply is lost. At the end of 72 hours following the initiation of a DBA, enough

30PED10AA029A	POST-DBA UHS Makeup Keep-Fill Line Isolation Valve Train 1	GT	MA	3	B	P	O	ET	2Y	
30PED10AA223A	POST-DBA UHS Makeup Keep-Fill Line Check Valve Train 1	CK	SA	3	C	A	O/C	ET	Q	
30PED10AA028A	UHS Makeup Keep-Fill Line Isolation Valve Train 1	GT	MA	3	B	P	O	ET	2Y	
30PED10AA222A	UHS Makeup Keep-Fill Line Check Valve Train 1	Ck	SA	3	C	A	O/C	ET	Q	

Table 3.9-2— {Site-Specific Inservice Valve Testing Program Requirements}

(Page 1 of 5)

Valve Identification Number [1]	Description /Valve Function	Valve Type [2]	Valve Actuator [3]	ASME Code Class [4]	ASME OM Code Category [5]	Active/ Passive[6]	Safety Position [7]	Test Required [8, 11]	Test Frequency [9]	Comments
Ultimate Heat Sink (UHS) Makeup Water System - Train 1										
30PED10AA002A	UHS Makeup Water Pump Minimum Flow Valve Train 1	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PED10AA190A	UHS Makeup Water Pump Air Release/Vacuum Breaker Valve Train 1	RV	SA	3	C	A	O/C	ET LT PI	2Y 10Y 2Y	
30PED10AA201A	UHS Makeup Water Pump Discharge Check Valve Train 1	CK	SA	3	C	A	O	ET	Q	
30PED10AA001A	UHS Makeup Water Pump Discharge Isolation Valve Train 1	BF	MO	3	B	A	O	ET PI	Q 2Y	
-	UHS Makeup Water Pump Initial Fill Check Valve Train 1	CK	SA	3	C	A	C	ET	Q	
-	UHS Makeup Water Pump Initial Fill Isolation Valve Train 1	GT	MO	3	B	A	C	ET PI	Q 2Y	
30PED10AA005A	UHS Makeup Water Train 1 Test Bypass Isolation Valve	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PED10AA006A	UHS Makeup Water Pump Discharge Strainer Blowdown Isolation Valve Train 1	GT	MO	3	B	A	C	ET PI	Q 2Y	
-	UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 1	BF	MA	3	B	P	O	ET PI	2Y 2Y	
Ultimate Heat Sink (UHS) Makeup Water System - Train 2										
30PED20AA002A	UHS Makeup Water Pump Minimum Flow Valve Train 2	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PED20AA190A	UHS Makeup Water Pump Air Release/Vacuum Breaker Valve Train 2	RV	SA	3	C	A	O/C	ET LT PI	2Y 10Y 2Y	
30PED20AA201A	UHS Makeup Water Pump Discharge Check Valve Train 2	CK	SA	3	C	A	O	ET	Q	
30PED20AA001A	UHS Makeup Water Pump Discharge Isolation Valve Train 2	BF	MO	3	B	A	O	ET PI	Q 2Y	

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30PED20AA029A	POST-DBA UHS Makeup Keep-Fill Line Isolation Valve Train 2	GT	MA	3	B	P	O	ET	2Y	
30PED20AA223A	POST-DBA UHS Makeup Keep-Fill Line Check Valve Train 2	CK	SA	3	C	A	O/C	ET	Q	
30PED20AA028A	UHS Makeup Keep-Fill Line Isolation Valve Train 2	GT	MA	3	B	P	O	ET	2Y	
30PED20AA222A	UHS Makeup Keep-Fill Line Check Valve Train 2	Ck	SA	3	C	A	O/C	ET	Q	

Table 3.9-2— {Site-Specific Inservice Valve Testing Program Requirements}

(Page 2 of 5)

Valve Identification Number [1]	Description /Valve Function	Valve Type [2]	Valve Actuator [3]	ASME Code Class [4]	ASME OM Code Category [5]	Active/ Passive[6]	Safety Position [7]	Test Required [8, 11]	Test Frequency [9]	Comments
-	UHS Makeup Water Pump Initial Fill Check Valve Train 2	CK	SA	3	C	A	C	ET	Q	
-	UHS Makeup Water Pump Initial Fill Isolation Valve Train 2	GT	MO	3	B	A	C	ET PI	Q 2Y	
30PED20AA005A	UHS Makeup Water Train 1 Test Bypass Isolation Valve	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PED20AA006A	UHS Makeup Water Pump Discharge Strainer Blowdown Isolation Valve Train 2	GT	MO	3	B	A	C	ET PI	Q 2Y	
-	UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 2	BF	MA	3	B	P	O	ET PI	2Y 2Y	
Ultimate Heat Sink (UHS) Makeup Water System - Train 3										
30PED30AA002A	UHS Makeup Water Pump Minimum Flow Valve Train 3	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PED30AA190A	UHS Makeup Water Pump Air Release/Vacuum Breaker Valve Train 3	RV	SA	3	C	A	O/C	ET LT PI	2Y 10Y 2Y	
30PED30AA201A	UHS Makeup Water Pump Discharge Check Valve Train 3	CK	SA	3	C	A	O	ET	Q	
30PED30AA001A	UHS Makeup Water Pump Discharge Isolation Valve Train 3	BF	MO	3	B	A	O	ET PI	Q 2Y	
-	UHS Makeup Water Pump Initial Fill Check Valve Train 3	CK	SA	3	C	A	C	ET	Q	
-	UHS Makeup Water Pump Initial Fill Isolation Valve Train 3	GT	MO	3	B	A	C	ET PI	Q 2Y	
30PED30AA005A	UHS Makeup Water Train 1 Test Bypass Isolation Valve	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PED30AA006A	UHS Makeup Water Pump Discharge Strainer Blowdown Isolation Valve Train 3	GT	MO	3	B	A	C	ET PI	Q 2Y	
-	UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 3	BF	MA	3	B	P	O	ET PI	2Y 2Y	
30PED30AA029A	POST-DBA UHS Makeup Keep-Fill Line Isolation Valve Train 3	GT	MA	3	B	P	O	ET	2Y	
30PED30AA223A	POST-DBA UHS Makeup Keep-Fill Line Check Valve Train 3	CK	SA	3	C	A	O/C	ET	Q	
30PED30AA028A	UHS Makeup Keep-Fill Line Isolation Valve Train 3	GT	MA	3	B	P	O	ET	2Y	
30PED30AA222A	UHS Makeup Keep-Fill Line Check Valve Train 3	Ck	SA	3	C	A	O/C	ET	Q	

Table 3.9-2— {Site-Specific Inservice Valve Testing Program Requirements}

(Page 3 of 5)

Valve Identification Number [1]	Description /Valve Function	Valve Type [2]	Valve Actuator [3]	ASME Code Class [4]	ASME OM Code Category [5]	Active/ Passive[6]	Safety Position [7]	Test Required [8, 11]	Test Frequency [9]	Comments
Ultimate Heat Sink (UHS) Makeup Water System - Train 4										
30PED40AA002A	UHS Makeup Water Pump Minimum Flow Valve Train 4	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PED40AA190A	UHS Makeup Water Pump Air Release/Vacuum Breaker Valve Train 4	RV	SA	3	C	A	O/C	ET LT PI	2Y 10Y 2Y	
30PED40AA201A	UHS Makeup Water Pump Discharge Check Valve Train 4	CK	SA	3	C	A	O	ET	Q	
30PED40AA001A	UHS Makeup Water Pump Discharge Isolation Valve Train 4	BF	MO	3	B	A	O	ET PI	Q 2Y	
-	UHS Makeup Water Pump Initial Fill Check Valve Train 4	CK	SA	3	C	A	C	ET	Q	
-	UHS Makeup Water Pump Initial Fill Isolation Valve Train 4	GT	MO	3	B	A	C	ET PI	Q 2Y	
30PED40AA005A	UHS Makeup Water Train 1 Test Bypass Isolation Valve	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PED40AA006A	UHS Makeup Water Pump Discharge Strainer Blowdown Isolation Valve Train 4	GT	MO	3	B	A	C	ET PI	Q 2Y	
-	UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 4	BF	MA	3	B	P	O	ET PI	2Y 2Y	
Miscllaneous Manual Valves										
Later	UHS Makeup Water System Manual Valves	Various	MA	3	B	P	O/C	ET PI	2Y 2 Y	See Note 10
30PED40AA029A	POST-DBA UHS Makeup Keep-Fill Line Isolation Valve Train 4	GT	MA	3	B	P	O	ET	2Y	
30PED40AA223A	POST-DBA UHS Makeup Keep-Fill Line Check Valve Train 4	CK	SA	3	C	A	O/C	ET	Q	
30PED40AA028A	UHS Makeup Keep-Fill Line Isolation Valve Train 4	GT	MA	3	B	P	O	ET	2Y	
30PED40AA222A	UHS Makeup Keep-Fill Line Check Valve Train 4	Ck	SA	3	C	A	O/C	ET	Q	

Table 3.9-2— {Site-Specific Inservice Valve Testing Program Requirements}

(Page 4 of 5)

Valve Identification Number [1]	Description /Valve Function	Valve Type [2]	Valve Actuator [3]	ASME Code Class [4]	ASME OM Code Category [5]	Active/ Passive[6]	Safety Position [7]	Test Required [8, 11]	Test Frequency [9]	Comments

Notes:

1. The U. S. EPR subscribes to the Kraftworks Kennzeichen System (KKS) for coding and nomenclature of SSCs.
2. Valve Type
   GB – Globe
   GT – Gate
   CK – Check
   RV – Relief
   RD – Rupture Disk
   DI – Diaphragm
   BF – Butterfly
   PL – Plug
3. Valve Actuator
   MO – Motor-operated
   SO – Solenoid-operated
   AO – Air-operated
   HO – Hydraulic-operated
   SA – Self-actuated
   MA – Manual
   PA – Pilot-actuated
4. ASME Code Class as determined by quality groups from Regulatory 1.26.
5. ASME Code Category A, B, C, D as defined in ASME OM Code 2004, Subsection ISTC-1300
6. ASME functional category as defined in ASME OM Code 2004, Subsection ISTA-2000
7. Valve safety function positions(s), specify both positions for valves that perform a safety function in both the open and closed positions. Valves are exercised to the position (s) required to fulfill their safety function(s). Check valve tests include both open and closed tests.

Table 3.9-2— {Site-Specific Inservice Valve Testing Program Requirements}

(Page 5 of 5)

Valve Identification Number [1]	Description /Valve Function	Valve Type [2]	Valve Actuator [3]	ASME Code Class [4]	ASME OM Code Category [5]	Active/ Passive[6]	Safety Position [7]	Test Required [8, 11]	Test Frequency [9]	Comments

8. Required tests per ASME OM Code 2004, Subsection ISTC-3000
   LT – Leakage test per Table ISTC-3500-1 and ISTC-3000
   ET – Exercise test per Table ISTC-3500-1 and ISTC-3510-1, nominally every 3 months
   PI – Position indication verification per Table ISTC-3500-1 and ISTC-3700
   ST – Stroke time per test per ISTC-5000 (in conjunction with exercise test).

9. Test frequencies abbreviations per NUREG-1482, Revision 1:
   Q test performed once every 92 days
   CS – test performed during cold shutdown, but no more frequently than once every 92 days
   RF – test performed each refueling outage
   2Y – test performed once every 2 years
   5Y – test performed once every 5 years (per ASME OM, ISTC-3540)
   10Y - test performed once every 10 years
   RV – test relief valve at OM schedule.

10. Table entries for manual valves will be developed during detailed design engineering.

11. The switch for a fail-safe valve functions by interrupting (de-energizing) the electrical or pneumatic actuating force for the valve whenever the switch is moved to the fail-safe position. Therefore, this normal valve operation demonstrates the valve's fail-safe capability, which is verified during valve exercise testing by remote position indication. Since a successful exercise test satisfies a valve's fail-safe testing requirements, a separate test for fail-safe capability is not required and is not specified in this table.

Table 3.10-1— {Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}
(Page 4 of 15)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)		EQ Program Designation (Note 5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Alternate Supply Valve Train 1	-	M	M	-	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Train 1	-	-	M	M	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Intake Structure Level Measurement (All) Train 1	-	-	M	M	ES	SI	S		Y(5)
POST-DBA UHS Makeup Keep-Fill Line Orifice Train 1	-	31UQB	M	M	ES	SI	S		Y(5)
POST-DBA UHS Makeup Keep-Fill Line Isolation Valve Train 1	30PED10AA029	31UQB	M	M	ES	SI	S		Y(5)
POST-DBA UHS Makeup Keep-Fill Line Check Valve Train 1	30PED10AA223	31UQB	M	M	ES	SI	S		Y(5)
UHS Makeup Keep-Fill Line Isolation Valve Train 1	30PED10AA028	31UQB	M	M	ES	SI	S		Y(5)
UHS Makeup Keep-Fill Line Check Valve Train 1	30PED10AA222	31UQB	M	M	ES	SI	S		Y(5)
Train 2									
UHS Makeup Water Pump Train 2	30PED20AP001	30UPF01002	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Motor Train 2	30PED20AP001	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Pressure Instrument Root Valve Train 2	30PED20AA303	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Pressure Instrument Train 2	30PED20CP001	30UPF02004	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Discharge Flow Element Instrument Root Valve 1 Train 2	-	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Flow Element/Instrument Train 2	30PED20CF003	30UPF02004	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Discharge Flow Element Instrument Root Valve 2 Train 2	-	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Valve Train 2	30PED20AA002	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Valve Motor Actuator Train 2	30PED20AA002	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Line Orifice Plate Train 2	-	30UPF02004	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Air Release/Vacuum Breaker Valve, Vent Valve Train 2	-	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Air Release/Vacuum Breaker Valve, Isolation Valve Train 2	-	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)

Table 3.10-1— {Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 7 of 15)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)		EQ Program Designation (Note 5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Isolation Valve Train 2	-	-	M	M	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Isolation Valve Actuator Train 2	-	M	M	-	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Alternate Supply Valve Train 2	-	M	M	-	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Train 2	-	-	M	M	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Intake Structure Level Measurement (All) Train 2	-	-	M	M	ES	SI	S		Y(5)
POST-DBA UHS Makeup Keep-Fill Line Orifice Train 2	-	32UQB	M	M	ES	SI	S		Y(5)
POST-DBA UHS Makeup Keep-Fill Line Isolation Valve Train 2	30PED20AA029	32UQB	M	M	ES	SI	S		Y(5)
POST-DBA UHS Makeup Keep-Fill Line Check Valve Train 2	30PED20AA223	32UQB	M	M	ES	SI	S		Y(5)
UHS Makeup Keep-Fill Line Isolation Valve Train 2	30PED20AA028	32UQB	M	M	ES	SI	S		Y(5)
UHS Makeup Keep-Fill Line Check Valve Train 2	30PED20AA222	32UQB	M	M	ES	SI	S		Y(5)
Train 3									
UHS Makeup Water Pump Train 3	30PED30AP001	30UPF01003	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Motor Train 3	30PED30AP001	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Pressure Instrument Root Valve Train 3	30PED30AA303	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Pressure Instrument Train 3	30PED30CP001	30UPF02006	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Discharge Flow Element Instrument Root Valve 1 Train 3	-	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Flow Element/Instrument Train 3	30PED30CF003	30UPF02006	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Discharge Flow Element Instrument Root Valve 2 Train 3	-	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Valve Train 3	30PED30AA002	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Valve Motor Actuator Train 3	30PED30AA002	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Line Orifice Plate Train 3	-	30UPF02006	M	M	ES	SI	S		Y(5)

Table 3.10-1— {Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}
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Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)		EQ Program Designation (Note 5)
UHS Makeup Water Building Temperature Measurement Instruments (All) Train 3	-	-	M	M	ES	SI	S		Y(5)
UHS Makeup Water Building Safety Related Tornado Dampers Train 3	-	-	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Isolation Valve Train 3	-	-	M	M	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Isolation Valve Actuator Train 3	-	M	M	-	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Alternate Supply Valve Train 3	-	M	M	-	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Train 3	-	-	M	M	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Intake Structure Level Measurement (All) Train 3	-	-	M	M	ES	SI	S		Y(5)
POST-DBA UHS Makeup Keep-Fill Line Orifice Train 3	-	33UQB	M	M	ES	SI	S		Y(5)
POST-DBA UHS Makeup Keep-Fill Line Isolation Valve Train 3	30PED30AA029	33UQB	M	M	ES	SI	S		Y(5)
POST-DBA UHS Makeup Keep-Fill Line Check Valve Train 3	30PED30AA223	33UQB	M	M	ES	SI	S		Y(5)
UHS Makeup Keep-Fill Line Isolation Valve Train 3	30PED30AA028	33UQB	M	M	ES	SI	S		Y(5)
UHS Makeup Keep-Fill Line Check Valve Train 3	30PED30AA222	33UQB	M	M	ES	SI	S		Y(5)
Train 4									
UHS Makeup Water Pump Train 4	30PED40AP001	30UPF01004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Motor Train 4	30PED40AP001	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Pressure Instrument Root Valve Train 4	30PED40AA303	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Pressure Instrument Train 4	30PED40CP001	30UPF02008	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Discharge Flow Element Instrument Root Valve 1 Train 4	-	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Flow Element/Instrument Train 4	30PED40CF003	30UPF02008	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Discharge Flow Element Instrument Root Valve 2 Train 4	-	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Valve Train 4	30PED40AA002	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)

POST-DBA UHS Makeup Keep-Fill Line Orifice Train 4	-	34UQB	M	M	ES	SI	S		Y(5)
POST-DBA UHS Makeup Keep-Fill Line Isolation Valve Train 4	30PED40AA029	34UQB	M	M	ES	SI	S		Y(5)
POST-DBA UHS Makeup Keep-Fill Line Check Valve Train 4	30PED40AA223	34UQB	M	M	ES	SI	S		Y(5)
UHS Makeup Keep-Fill Line Isolation Valve Train 4	30PED40AA028	34UQB	M	M	ES	SI	S		Y(5)
UHS Makeup Keep-Fill Line Check Valve Train 4	30PED40AA222	34UQB	M	M	ES	SI	S		Y(5)

Table 3.10-1— {Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

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Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)		EQ Program Designation (Note 5)
High Side Root Valve for ΔP Measurement Across AHU Filter Train 4	-	-	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building AHU Supply Side Flow Measurement Instrument Train 4	-	-	M	M	ES	SI	S		Y(5)
UHS Makeup Water Building Temperature Measurement Instruments (All) Train 4	-	-	M	M	ES	SI	S		Y(5)
UHS Makeup Water Building Safety Related Tornado Dampers Train 4	-	-	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Isolation Valve Train 4	-	-	M	M	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Isolation Valve Actuator Train 4	-	M	M	?	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Alternate Supply Valve Train 4	-	M	M	?	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Train 4	-	-	M	M	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Intake Structure Level Measurement (All) Train 4	-	-	M	M	ES	SI	S		Y(5)
Fire Protection System									
Fire Protection Diesel Engine(s)/Diesel Engine Pump(s)		30USG	M	M		SII-SSE	NS-AQ		Y (5)
Fire Protection Diesel Engine(s)/Pump(s) Instrument(s)		30USG	M	M		SII-SSE	NS-AQ		Y (5)
Fire Protection Diesel Engine(s)/Pump(s) Valve(s)		30USG	M	M		SII-SSE	NS-AQ		Y (5)
Fire Protection System Isolation Valve(s)		30USG	M	M		SII-SSE	NS-AQ		Y (5)
Fire Protection System Check Valve(s)		30USG	M	M		SII-SSE	NS-AQ		Y (5)
Fire Protection System Pressure Relief Valve(s)		30USG	M	M		SII-SSE	NS-AQ		Y (5)
Fire Protection Water Storage Tanks Isolation Valve(s)			M	M		SII-SSE	NS-AQ		Y (5)

Table 3.10-1— {Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}
(Page 15 of 15)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)	Safety Class (Note 4)	EQ Program Designation (Note 5)
UHS Tower Basin Level Indicator	30PEB40CL001	34URB01003	M	M	ES PAM SI	S 1E EMC	Y (5) Y (6)

Notes:

1. EQ Environment (M= Mild, H= Harsh)
2. Radiation Environment Zone (M= Mild, H= Harsh)
3. RT (Reactor Trip), ES (Engineered Safeguards), PAM (Postaccident Monitoring), SI (Seismic I), SII (Seismic II), SII-SSE (Seismic II- Fire Protection System piping, valves, and equipment supplying fire suppression water to systems required for safe shutdown are required to operate following a Safe Shutdown Earthquake (SSE))
4. Safety Class: S (Safety-Related (i.e., QA Level I)), NS-AQ (Supplemental Grade Non-Safety (i.e., QA Level II)), 1E (Class 1E), EMC (Electromagnetic Compatibility), C/NM (Consumables/ Non Metalics)
5. Yes (1) = Full EQ Electrical, Yes (2) = EQ Radiation Harsh-Electrical, Yes (3) = EQ Radiation Harsh-Consumables, Yes (4) = EQ for Consumables, Yes (5) = EQ Seismic, Yes (6) = EQ EMC.
6. The UHS Makeup dual flow traveling screens are designed to withstand design basis seismic loads without a loss of their mechanical function and are designed to permit manual operator rotation and cleaning of the screen panels.

9.2.4.5 Instrumentation Requirements

Instrumentation includes level, temperature, pressure and flow as required for process automation, and for the visual and audible indication and alarms necessary for monitoring of system performance.

9.2.4.6 References

This section is added as a supplement to the U. S. EPR FSAR.

ANSI, 2004. Emergency Eyewash and Shower Equipment, ANSI Z358.1, American National Standards Institute, 2004.

CFR, 2008. Control of Releases of Radioactive Materials to the Environment, Title 10, Code of Federal Regulations, Part 50, Appendix A, General Design Criterion 60, U. S. Nuclear Regulatory Commission, 2008.}

9.2.5 Ultimate Heat Sink

{No departures or supplements.}

9.2.5.1 Design Basis

A COL Applicant that references the U.S. EPR FSAR design certification will provide site specific design information corresponding to U.S. EPR FSAR Figure 9.2.5-2 [[Conceptual Site Specific UHS Systems]].

The conceptual design information is addressed as follows:

648 gpm (2,452.68 lpm)

and provide makeup water to the UHS Makeup Water System to compensate for valve seat leakage and other minor losses

{ESWS support systems are schematically represented in Figure 9.2-3. For the two operational cooling tower basins, normal essential service water makeup provides a maximum of ~~627 gpm (2373 lpm)~~ of desalinated water to replenish ESWS inventory losses due to evaporation, blowdown, ~~and~~ drift, during normal operations and shutdown/cooldown. ESWS cooling tower blowdown discharges up to 61 gpm (231 lpm) of water to the retention basin to maintain ESWS chemistry. This quantity is based on maintaining ten cycles of concentration in the cooling tower basin.

During the post-72 hour design basis accident condition, the ESWS Cooling Tower for one train has a maximum evaporative loss of ~~225 gpm (852 lpm)~~. 249 gpm (943 lpm)

The UHS Makeup pump provides up to 750 gpm (approximately 2,835 lpm) of water to each operating UHS cooling tower basin to replenish the UHS cooling tower basin losses due to evaporation, system leakages, and other losses, starting 72 hours post-accident.

~~Chemical treatment of UHS Makeup Water System during full flow testing is conducted using portable skids and totes as required.~~

The UHS Makeup Water System is designed to permit periodic inspection of components necessary to maintain the integrity and capability of the system to comply with 10 CFR 50 Appendix A, General Design Criterion 45.

The UHS Makeup Water System is designed to permit operational functional testing of safetyrelated components to ensure operability and performance of the system to comply with 10 CFR 50 Appendix A, General Design Criterion 46.}

An emergency blowdown path is provided from the same pump discharge connection through a second safety-related MOV in case the normal path is unavailable.

Under normal operating conditions and shutdown/cooldown conditions, the normal blowdown valves automatically modulate blowdown flow from their ESWS trains to the retention basin to help ensure cooling water chemistry remains within established limits.

During a DBA, blowdown flow can be manually controlled from the main control room by adjustment of the safety-related MOV.}

9.2.5.2.3 {UHS Makeup Water System

{Emergency makeup water for the ESWS is provided by the site-specific, safety-related UHS Makeup Water System that draws water from the Chesapeake Bay. The common forebay is shared between the CWS makeup water system and UHS makeup water system. Two buried 60" safety-related pipes provide a flow path for Chesapeake Bay water to enter the common forebay. Both pipes are designed to account for head losses in the pipe and provide sufficient flow for the CWS makeup and UHS makeup. Both pipes are normally in operation, however, either pipe can be isolated for maintenance as the other pipe is capable of providing 100% flow for CWS makeup and UHS makeup. Due to the head loss through the pipes, the design low water level at the common forebay for the UHS makeup intake is at EL. -8 ft NGVD29, which is lower than the predicted minimum low water level in the Chesapeake Bay of -7.7 ft NGVD29. The common forebay invert elevation is at -22.5 ft NGVD29, which provides ample additional margin in pump submergence during UHS operation with one or two intake pipes. The UHS Makeup Water Intake Structure houses four bar screens and four dual-flow traveling screens that remove large debris and trash that may be entrained in the flow. Each traveling screen is located in a separate enclosure and provides the required flow to the associated UHS Makeup Water Pump. Each traveling screen is equipped with a screen wash system which provides a high pressure spray to remove debris from the traveling screens.

There are four independent UHS Makeup Water System trains, one for each ESWS division. Each train has one vertical turbine type wet pit pump, a discharge check valve, a manual isolation valve, a self-cleaning strainer, and a pump discharge isolation MOV (all housed in four separate rooms at the UHS Makeup Water Intake Structure), plus the buried piping running up to and into the ESWS pumphouse at the ESWS cooling tower basin. The UHS Makeup Water System isolation MOV is located inside the ESWS pumphouse at the connection to the ESWS cooling tower basin.

Editors Note: See FSAR Insert 1 for Section 9.2.5.2.3

In addition, each train has a surveillance test bypass that runs from just upstream of the isolation MOV at the ESWS cooling tower basin, through a safety-related valve, to the blowdown line upstream of the blowdown flow meter. The latter safety-related valve is normally closed, and will remain closed, providing assurance of UHS Makeup Water System integrity. The test bypass valves are locked closed to provide assurance of the UHS Makeup Water System integrity. ~~Test bypass piping and valve is identified in Section 1.8.2, as a departure from the U.S. EPR FSAR.~~

Instrumentation and controls are provided in the main control room (MCR) and remote shutdown station (RSS) for monitoring and controlling individual components and system functions. Switchgear and electrical equipment supplying power to the pump and MOVs of each train are located in its associated UHS Makeup Water pump room and UHS Makeup Water transformer room. Safety-related components of each of the four UHS Makeup Water System trains are powered by the Class 1E electrical bus for each division and the respective emergency diesel generator (EDG).

Insert 1 for FSAR Section 9.2.5.2.3

The UHS Makeup Water system is equipped with UHS Makeup Keep-Fill line and Post- DBA UHS Makeup Keep-Fill line. The UHS Makeup Keep-Fill line delivers makeup water from the site-specific non safety-related normal makeup water system to the safety-related UHS Makeup Water system to keep the system piping full of water and replenish the system water losses due to leakage. The UHS Makeup Keep-Fill line runs from upstream of the normal makeup water motor operated isolation valve 30PED10/20/30/40 AA019) at the ESWS cooling tower basin, through safety-related isolation valve (30PED10/20/30/40 AA028) and safety-related check valve (30PED10/20/30/40 AA222), to the UHS Makeup Water System line upstream of the safety-related ESWS Emergency Makeup Water line motor operated isolation valve(s) (30PED10/20/30/40 AA021). The safety-related UHS Makeup Keep-Fill isolation valve(s) are normally opened, and remain opened during post DBA. The UHS Makeup Keep-Fill line check valve(s) will ensure the system's integrity.

The Post-DBA UHS Makeup Keep-Fill line delivers water from the safety-related ESW System return line to the UHS Makeup Water System to keep the system piping full of water and replenish the system water losses due to leakage. The Post-DBA UHS Makeup Keep-Fill line runs from upstream of the ESW System return line motor operated isolation valve 30PED10/20/30/40 AA010) at the ESWS cooling tower basin, through safety-related isolation valve (30PED10/20/30/40 AA029), safety-related check valve (30PED10/20/30/40 AA223), and safety-related flow restriction orifice, to the UHS Makeup Water System line upstream of the safety-related ESWS Emergency Makeup line motor operated isolation valve(s) (30PED10/20/30/40 AA021). The flow restriction orifice restricts the makeup flow to the UHS Makeup Water System based on the system leakage rate specified by the plant owner. The safety-related Post-DBA UHS Makeup Keep-Fill isolation valve(s) are normally opened, and remain opened during post DBA. The Post-DBA UHS Makeup Keep-Fill line check valve(s) will ensure the system's integrity.

A general area drawing of the site-specific CCNPP Unit 3 UHS Makeup Water Intake and Circulating Water Makeup Water Intake Structures is shown in Figure 9.2-4. Plan views of the UHS Makeup Water Intake Structure are shown in Figure 9.2-5 and Figure 9.2-6. A section view is shown in Figure 9.2-8. The UHS Makeup Water System is shown in Figure 9.2-9.}

9.2.5.2.4 ESWS Makeup Water Chemical Treatment

{There are chemical additives used in the ESWS cooling towers to reduce scaling and corrosion, and to treat potential biological contaminants, which are added via the normal ESWS piping. The ESW makeup chemical treatment system provides the chemistry control in both instances.

The treatment system consists of multiple skid-mounted arrangements, one for each division's ESWS cooling tower. Each skid contains the equipment, instrumentation and controls to fulfill the system's function of both monitoring and adjusting water chemistry.

The specific chemicals and addition rates are determined by periodic water chemistry analyses. The chemicals are divided into six categories, based on function:

- biocide - prevents buildup of potentially damaging aquatic life, such as zebra mussels, and controls bacterial growth in the ESWS cooling towers (particularly Legionellae).
- algaecide - prevents buildup of potentially damaging algae and plant growth.
- pH adjuster - counteracts the acidic effects of the algaecide.
- corrosion inhibitor - prevents corrosion of piping and components due to saltwater environment and exposure.
- scale inhibitor - prevents buildup of scale and mineral deposits that could inhibit process flow.
- silt dispersant - prevents buildup of hard silt deposits.

Additions to the ESWS cooling towers are made as necessary on a periodic or continuing basis. ~~The additions to the UHS Makeup Water System are made coincident with surveillance test runs, or as otherwise needed.~~

(TBD) - Site-specific chemistry comparison for normal and emergency makeup water.}

9.2.5.3 Component Description

9.2.5.3.1 Mechanical Draft Cooling Towers

The U.S. EPR FSAR includes the following COL Items in Section 9.2.5.3.1:

> A COL applicant that references the U.S. EPR design certification will confirm that the site characteristic sum of 0% exceedance maximum non-coincident wet bulb temperature and the site-specific wet bulb correction factor does not exceed the value provided in Table 9.2.5-2. If the value in Table 9.2.5-2 is exceeded, the maximum UHS cold-water return temperature of 95°F is to be confirmed by analysis (see Section 9.2.5.3.3).
>
> A COL applicant that references the U.S. EPR design certification will perform an evaluation of the interference effects of the UHS cooling tower on nearby safety-related air intakes. This evaluation will confirm that potential UHS cooling tower interference

effects on the safety related air intakes does not result in air intake inlet conditions that exceed the U.S. EPR Site Design Parameters for Air Temperature as specified in Table 2.1-1.

The COL Items are addressed as follows:

Confirmation that the site characteristic sum of 0% exceedance maximum non-coincident wet bulb temperature and the site-specific wet bulb correction factor do not exceed the value provided in U.S. EPR FSAR Table 9.2.5-2, or an analysis that the maximum UHS cold-water return temperature does not exceed 95°F, if applicable, is provided in Section 9.2.5.3.3.

Confirmation that potential UHS cooling tower interference effects on the safety-related air intakes does not result in air intake inlet conditions that exceed the U.S. EPR FSAR Table 2.1-1, Site Design Envelope Parameters for Air Temperature, is provided in Section 9.2.5.3.3.

9.2.5.3.2 Piping, Valves, and Fittings

No departures or supplements.

{The following sections are added as a supplement to the U.S. EPR FSAR.

Normal ESW Makeup Isolation Valves

The normal ESWS Makeup Water System isolation valves are safety-related MOVs designed to ASME Section III, Class 3 requirements, and made of ~~materials~~ [super austenitic stainless steel, which is] compatible with the brackish UHS makeup water.

UHS Makeup Water Intake Structure Bar Screens and Traveling Screens

The UHS Makeup Water Intake Structure has four bar screens and four dual-flow traveling screens. The screens prevent debris from passing into the UHS Makeup Water System. The traveling screens are equipped with a Seismic Category II screen wash system that includes four screen wash pumps. The screen wash pumps provide a high pressure spray to remove debris from the traveling screens. These traveling screens are classified as NS-AQ and are designed to remain mechanically functional following an SSE. The ability to manually rotate and clean the travelling screens to ensure adequate flow to the UHS makeup water pumps following a DBA is also provided. The structure housing the traveling screens will protect them from other natural phenomena, e.g. hurricane, tornado. The structure also provides separation between the screens for each of the four divisions. During normal operation, the traveling screens are powered from the Normal Power Supply System. Backup (Class IE) power supply is provided to operate the traveling screens post-DBA through the Emergency Power Supply System if the electrical components of the traveling screens are functional post DBA.

Editors Note: Markups shown in black (text boxes, strikethrough, and black text) are markup from RAI 325 Q07.05-01 Response.

UHS Makeup Water System Pumps

There are four vertical turbine pumps, each rated at 750 gpm (approximately 2835 lpm). Each pump is driven by an electric motor, and is equipped with a discharge check valve[, a manual isolation valve,] and motor operated isolation valve. Opening of the motor-operated isolation valve is ~~timed with the start of the associated UHS Makeup Water Pump to minimize dynamic effects on the system.~~ [initiated once the minimum required pump flow is established through the minimum flow recirculation line.] A minimum flow recirculation valve opens ~~in the event the pump discharge valve fails to open,~~ [on a specified time delay associated with the start of the pump] to assure pump minimum flow requirements are satisfied. The four vertical pumps are designed to ASME Section III, Class 3 requirements, and constructed of ~~materials~~ super austenitic stainless steel, which is compatible with the brackish UHS makeup water.

Minimum water levels in the UHS Makeup Water Intake Structure basin considers minimum submergence requirements to prevent vortex effects and net positive suction head (NPSH) to prevent cavitation of the UHS Makeup Water pump. The minimum available NPSH is approximately 41.5 ft. The excess margin at the most limiting condition between the available and required NPSH is approximately 34.3 feet. The total developed head (TDH) for the UHS Makeup Water pump is 180 ft. TDH is calculated considering the pressure drop through the piping, valves and components, suction head, and the static head. In order to provide a more conservative result for the UHS Makeup Water pump TDH, a 10% margin is included in the calculated value of 180 ft. Water level is continuously measured and monitored by safety-related instrumentation in the UHS Makeup Water Intake Structure to initiate proper (automatic or manual) operation of the traveling screen. Hence the minimum water level is maintained for safe pump operation. The design low water level at the UHS Makeup Water pump suction pit is at EL -11.7 feet. The minimum water level at the UHS Makeup Water pump suction pit considers a head loss of 1.5 ft across the traveling screen.

UHS Makeup Water System Isolation Valves

The UHS Makeup Water System isolation valves are safety-related MOVs designed to ASME Section III, Class 3 requirements, and are made of ~~materials~~ super austenitic stainless steel, which is compatible with the brackish UHS makeup water. For each train, there are UHS Makeup Water System Pump isolation, minimum flow recirculation, pump discharge strainer blowdown isolation~~,~~ and initial fill isolation MOVs, the UHS Makeup Water System isolation MOV at the ESWS cooling tower basin, and the UHS Makeup Water System bypass isolation MOV, manual UHS Makeup Keep-Fill line isolation valve, and manual Post-DBA UHS Makeup Keep-Fill line isolation valve.

Leakage rates for boundary isolation valves are based on ASME OM Code 2004 Edition, Subsection ISTC. The design of the UHS Makeup Water System pump capacity considers the expected valve seat leakage for the boundary isolation valves. Since UHS Makeup pump capacity has significant margin, boundary valve leakage rates are inconsequential.

For operating trains, the following describes the operation of key systems valves:

Editors Note: See RAI 325 Response Insert 1 for Section 9.2.5.3.2

~~The UHS Makeup Water pump discharge isolation valve, 30PED10/20/30/40 AA001, is normally closed. Upon the receipt of SI signal, the UHS Makeup Water pump discharge isolation valve remains closed. To mitigate the effect of water hammer during startup, the ESWS emergency makeup water isolation valve is closed and the UHS Makeup Water System pumps are manually started against a closed motor operated UHS Makeup Water pump discharge isolation valve. The pump discharge isolation valve will be opened and controlled automatically to slowly fill the UHS Makeup Water System piping with Chesapeake Bay water. Once the system is full, the pump discharge isolation valve and ESWS emergency isolation valve are completely are completely opened to maintain the UHS tower basin level within the established operating limits.~~

~~The UHS Makeup Water pump minimum flow recirculation valve, 30PED10/20/30/40 AA002, is normally shut during normal operations. Prior to initial fill of the system, pump minimum flow recirculation valve is opened and controlled automatically to maintain the required pump flow, when the system is slowly being filled. Following an SI signal coincident with a low UHS basin water level and once the UHS Makeup Water system piping is full, the pump minimum flow recirculation valve is closed and the UHS Makeup Water pump discharge valve is opened~~

Editors Note: See RAI 325 Response Insert 2 for Section 9.2.5.3.2

fully to provide makeup water to the UHS tower basin. The UHS Makeup pump minimum flow recirculation valve is opened, once the UHS tower basin is filled to operating level and the ESW Emergency Makeup discharge isolation valve is closed, to provide minimum required flow for continuous UHS Makeup Water pump operation. The pump minimum flow recirculation valve is closed in conjunction with the opening of ESW Emergency Makeup water isolation valve to provide the necessary flow to the UHS cooling tower basin.

The UHS Makeup Water pump discharge strainer blowdown isolation valve, 30PED10/20/30/40 AA006, is cycled open and shut automatically as necessary during UHS Makeup Water System pump operation to provide a flow path for debris removal from the pump discharge strainer during the automatic backwash cycle. The pressure relief backwash process of the filter is initiated by either the signal of differential pressure measuring system, a timer, after the start of the UHS Makeup Water pump, or via manual operator initiation. The pump discharge strainer blowdown isolation valve opens and the drive motor is energized. Upon receipt of an SI signal, the UHS Makeup Water pump discharge strainer blowdown isolation valve will automatically receive a signal to close.

The initial fill motor operated isolation valve, 30PED10/20/30/40 AA004, is closed during normal operation. Upon the receipt of an SI signal, this valve remains closed.

The manual UHS Makeup Keep-Fill line isolation valve, 30PED10/20/30/40 AA028 and the manual Post-DBA UHS Makeup Keep-Fill line isolation valve 30PED10/20/30/40 AA029 are opened during normal plant operation and remain opened during post accident conditions.

The manual UHS Makeup Water System test bypass isolation valve, 30PED10/20/30/40 AA023 AA008 is locked closed during normal operation and remains locked closed for post accident operation.

Editors Note: See Response to RAI 340 Q03.09.06-4 transmitted on July 26, 2012

UHS Makeup Water System Self Cleaning Strainers

There are four UHS Makeup Water System self-cleaning strainers [...] ge side of each UHS Makeup Water pump. They are designed to ASME [...] ements, and constructed of materials super austenitic stainless steel, which is compatible with the brackish UHS makeup water.

The strainers remove debris from the process flow that is not trapped by the bar screens and traveling screens.

UHS Makeup Water System Piping

The UHS Makeup Water System piping and fittings that perform safety functions are designed to ASME Section III, Class 3 requirements, including normal operation and anticipated transient conditions. They are constructed of materials super austenitic stainless steel, which is compatible with the brackish UHS makeup water.

Pipe diameters for all branches of the UHS Makeup Water System are based on limiting the flow velocity to 10 ft/sec for normal modes of operation (during DBA). Pipe diameters for normal makeup and blowdown lines are also based on limiting the flow velocity to 10 ft/sec for normal operation, shutdown/cooldown conditions and Design Basis Accident conditions.

The UHS Makeup Water System piping is normally in a state of dry wet layup. During post DBA scenario, the UHS Makeup Water system and is exposed to brackish water from 72 hours out through 30 days. at all times. All piping, valves and fittings are made of super austenitic stainless steel. Additionally, the exterior surface exposed to the soil is cathodically protected.

Chemical Treatment System Components

meteorological data, it has been determined that the maximum ESWS supply temperature is less than 95° F (35° C) and the maximum evaporative loss from a UHS cooling tower during the post-72 hour design basis accident condition is ~~225 gpm (852 lpm)~~ 249 gpm (943 lpm).

Minimum Cooling

The meteorological conditions resulting in minimum cooling due to evaporation of water are presented in the table below.

The site wet bulb temperature was calculated using site dry bulb temperature, dew point temperature, and station atmospheric pressure. The evaporation potential was determined as the difference between the moisture content of saturated air at the dry bulb temperature minus the actual moisture content of the air. The computer program used a rolling average to establish the 72-hour period of dry-bulb and wet bulb temperatures, and the evaporation potential. Any missing hourly data was filled in using the last temperature reading (e.g., if the temperature data was missing at 1200h, the data at 1100h is used). The computer program skipped any non-hourly data (e.g., data at 1430 hours), and the maximum number of missing hours allowed in any 72-hour running average was four. The rolling average data set was not used if the maximum number of missing hours over the 72-hour period exceeded four.

A software routine used in the Ultimate Heat Sink analysis calculation evaluated 30 years of meteorological data (PAXNAS) for Patuxent River Naval Air Station (11 miles from CCNPP Unit 3) and determined the worst 24 hour period from the perspective of minimum cooling. These ambient temperature conditions are imposed on the cooling tower model for the first 24 hours of the DBA.

The table below provides a comparison of the Table 9.2.5-4 values in the U.S. EPR FSAR and the CCNPP site-specific values used for minimum cooling from the UHS. Because the same 24 hours of temperature values are used to determine the minimum water cooling in the UHS for both the U.S. EPR FSAR and CCNPP Unit 3, the minimum water cooling is the same and as such, the U.S. EPR design values envelop the CCNPP3 site characteristics.

	US EPR FSAR Table 9.2.5-4		**Calvert Cliffs Site-Specific Value**	
Time (hr)	**Wet Bulb Temp (°F)**	**Dry Bulb Temp (°F)**	**Wet Bulb Temp (°F)**	**Dry Bulb Temp (°F)**
1	75.8	82	75.8	82
2	76.1	83	76.1	83
3	76.1	83	76.1	83
4	77.3	85	77.3	85
5	79.7	89	79.7	89
6	80.8	91	80.8	91
7	82	93	82	93
8	84.6	99	84.6	99
9	85.3	99	85.3	99
10	85.3	99	85.3	99
11	84.2	100	84.2	100
12	84.2	100	84.2	100
13	84.6	99	84.6	99
14	83.9	99	83.9	99
15	83.9	99	83.9	99
16	82.6	96	82.6	96
17	82.6	93	82.6	93

	US EPR FSAR Table 9.2.5-4		Calvert Cliffs Site-Specific Value	
Time (hr)	Wet Bulb Temp (°F)	Dry Bulb Temp (°F)	Wet Bulb Temp (°F)	Dry Bulb Temp (°F)
18	82.1	91	82.1	91
19	82.1	91	82.1	91
20	81.9	90	81.9	90
21	80.7	88	80.7	88
22	80.7	88	80.7	88
23	79.5	86	79.5	86
24	79.5	86	79.5	86

A marine weather dataset from the International Comprehensive Ocean Atmosphere Data Set (ICOADS) maintained by the National Center for Atmospheric Research (NCAR) Computational & Information Systems Laboratory (CISL) for the period 1940 through 2005 was reviewed for a region extending from 33° latitude to 41° latitude and from 277° longitude to 288° longitude to determine the historical maximum sea surface temperature experienced in the region nearest the plant (NCAR, 2006). This area encompasses a rectangle of approximately 480 miles by 600 miles, centered on the CCNPP Unit 3 site. This review indicates a maximum surface temperature of the water in Chesapeake Bay of 93° F which is less than the maximum allowable ESW inlet temperature of 95° F as described in U.S. EPR FSAR Section 9.2.1. Therefore, UHS makeup water flow to the cooling tower will not increase the cooling tower basin water temperature beyond 95° F, and therefore, will not adversely impact ESW system safety function.

Figure 9.2-3 provides the interface between the ESW and the UHS makeup water system. U.S. EPR FSAR Section 9.2 provides a detailed discussion of the ESW system, including a simplified flow arrangement for the ESW system.

(TBD) - Cooling tower interference on safety-related intakes.}

9.2.5.3.4 Coarse and Fine Screens

No departures or supplements.

9.2.5.4 System Operation

9.2.5.4.1 Normal Operating Conditions

{The normal ESWS makeup is supplied from the desalinization plant. The two operating ESWS divisions have the normal makeup MOVs open, while the two standby divisions' normal makeup MOVs are closed.

Blowdown from each train is aligned to the waste water retention basin, with flow rate controlled by manual adjustment of the safety-related motor operated blowdown isolation valve.

The UHS Makeup Water System for each division is in standby [mode], with the ~~UHS~~ [ESW System Emergency] Makeup Water System isolation MOV at the ESWS cooling tower basin closed ~~and~~ [,] the pump isolation MOV closed [, the UHS Makeup Keep-Fill isolation valve opened, the UHS Makeup Keep-Fill line check valve open and close, the post-DBA UHS Makeup Keep-Fill isolation valve opened, the post-DBA UHS Makeup Keep-Fill line check valve open and close, as required to maintain the UHS Makeup Water System full.] The ~~bypass line's MOV~~ [test bypass isolation valve] is also closed.

Periodic surveillance testing is conducted to demonstrate UHS Makeup Water System operability.}

9.2.5.4.2 Abnormal Operating Conditions

During plant normal operation, the UHS makeup Keep-Fill line and post-DBA UHS makeup Keep-Fill line manual isolation valves are opened. During DBA, these valves will remain open to allow makeup water flow path to the UHS Makeup Water System. During abnormal operation condition, operator

~~{On receipt of an accident signal, the normal ESWS Makeup Water System isolation MOVs that are open will close; those that are closed will remain closed. In addition, the ESWS cooling tower blowdown isolation valves will close, and any open safety-related valves in the chemical treatment system will close. None of these safety-related valves can be opened until the accident signal is cleared. Subsequent~~ action is manually initiated from the main control room or locally, based on operators' judgment resulting from prevailing conditions and indications. This includes initiating the safety-related UHS Makeup Water System to any and/or all ESWS cooling tower basins, as well as blowdown from any and/or all ESWS cooling tower basins. ~~as well as manual rotation and cleaning of traveling screens if required.}~~

safety-related

9.2.5.5 Safety Evaluation

{This section of the U.S. EPR FSAR is incorporated by reference with the following supplemental information.

Section 9.2.5.5 of the U.S. EPR FSAR discusses the need to verify that the makeup water supply is sufficient for the site-specific ambient conditions. Per the U.S. EPR FSAR, this is addressed as a part of COL Item 2.0-1. CCNPP Unit 3 utilizes Table 2.0-1 in order to respond to COL Item 2.0-1. Table 2.0-1 refers to FSAR Section 9.2.1 with respect to the acceptability of site-specific temperature characteristics for the U.S. EPR FSAR, UHS Design.

Editors Note: Markups shown in black (text boxes, strick-throughs add black text) are markups from RAI 330 Q09.02.05-20

Normal ESWS makeup is a non-safety-related function, and thus requires no safety evaluation with respect to design basis events. Similarly, both cooling tower blowdown and chemical treatment are non-safety-related functions and require no safety evaluation. However, the connections to safety-related piping through which these functions are made and the accompanying isolation valves are safety-related, which ensures the integrity of the safety-related piping in the event of a DBA.

The UHS Makeup Water System function is to provide reliable makeup to the ESWS cooling tower basins, starting no later than 72 hours after receipt of an accident signal, to ensure that sufficient makeup flow is provided so the ESWS can fulfill its design requirement of shutdown decay heat removal for a minimum of 30 days following a DBA.

This function is assured because the UHS Makeup Water System:

Editors Note: Markups shown in black (text boxes, strickthroughs add black text) are markups from RAI 325 Q07.05-1.

- Meets the requirements of GDC 2.
- Meets the requirements of Regulatory Guide 1.27 and GDC 44.
- Is designed, procured, constructed and operated in accordance with the criteria for ASME Section III, Class 3 safety-related systems, structures and components, and Seismic Category 1 requirements, including the tie-in piping and isolation valves for normal makeup, and sampling.
- Has four equivalent and completely independent trains, any two of which are capable of providing the required worst case makeup flow.
- Has components, including the UHS Makeup Water System pump and its associated valves, strainer, electrical switchgear, traveling screens, and ~~local controls and instrumentation~~ other components that are protected against the effects of external and internal flooding as described in Section 3.4.3.10.

- Has an UHS Makeup Water Intake Structure which is designed and built for protection against seismic and missile hazards.
- Has each UHS Makeup Water System pump installed such that its function is protected against the worst case low water event.
- Has seismically qualified and installed (buried) piping runs from the UHS Makeup Water Intake Structure to the individual ESWS cooling tower basins.
- As described in FSAR Section 3.5.2, the UHS makeup water system buried components, including underground piping, cables, and instrumentation from the UHS makeup water intake structure to the essential service water pump building are buried at a sufficient depth to withstand the effects of postulated missile hazards.
- ~~Is treated to meet specified limits on system water chemistry in order to prevent potentially detrimental fouling of stagnant piping sections and surfaces.~~
- Is periodically performance tested and sampled to confirm operability and verify system water chemistry requirements.
- Has a set of traveling screens that remain mechanically functional following an SSE. The ability to manually rotate and clean the traveling screens to ensure adequate flow to the UHS makeup water pumps following a DBA is also provided.
- Is powered by the Class 1E electrical bus for each division and the respective emergency diesel generator (EDG).

Editors Note: See FSAR Insert 2 for Section 9.2.5.5

The UHS makeup system piping is normally in a state of dry layup. The UHS makeup system is not used during normal operations, and is designed to provide a backup source of makeup water to the UHS cooling towers 72 hours post accident when the normal source of makeup water is unavailable. In the event that makeup to the UHS cooling towers from the UHS makeup system is required, operator action will start the desired UHS makeup pumps to prime the respective system trains as per the plant emergency operating procedures. Prior to the start of the pumps, operators ensure that there is adequate water level in the pump bay, and traveling screens are not blocked to supply necessary water flow. To mitigate the effect of water hammer during startup, the emergency service water isolation valve is closed and the UHS makeup water system pumps are started manually against closed motor operated discharge isolation valves. The discharge isolation valves will be opened and controlled to slowly fill the piping system with Chesapeake Bay water. The recirculation valves are also opened to ensure that minimum flow required for the pumps is achieved. Once the system is full, the pump discharge isolation valves and emergency service water isolation valves are fully opened and the recirculation valves are closed, to provide flow to the UHS cooling tower basin. Adequate vents will be provided to release air at appropriate high points to expel entrapped air to ensure complete system fill. Once the UHS Makeup pumps are started manually, remaining operations are accomplished automatically.

The dry layup of the system is preferable over the wet layup to prevent bio-fouling. The UHS makeup system will incorporate design provisions that minimize the effect of hydraulic transients upon the functional capability and the integrity of the system components. These design features include slowstroke motor-operated valves, air release valves to fill and keep the system full, valve control and interlock features that ensure correct valve line up prior to pump start, and discharge isolation valves that open and close with pump start and stop signals. To keep the UHS makeup piping in dry layup, drains will be provided at low points and

Insert 2 for COLA Section 9.2.5.5

The UHS Makeup Water System piping is normally in a state of wet layup. This system is not used during plant normal operations, and is designed to provide a backup source of makeup water to the UHS cooling tower basin starting 72 hours post-accident, when the normal source of makeup water is unavailable. In the event that makeup water to the UHS cooling towers from the UHS Makeup Water System is required starting 72 hours post accident, operator action will start the desired UHS Makeup Water pumps to the respective system trains as per the plant emergency operating procedures. Prior to the start of the pumps, operators ensure that there is adequate water level in the pump bay, and the traveling screens are rotated at least ¼ turn to ensure that they are not blocked, to supply the necessary water flow path. In addition, each train has a UHS Makeup Keep-Fill line equipped with a manual isolation valve and check valve to maintain the UHS Makeup Water System full due to leakage, and keep the piping full during plant normal operation. The UHS Makeup Keep-Fill Line delivers water from the site-specific non safety-related normal makeup water system to the UHS Makeup Water System during plant normal operation. Also, each train has a Post-DBA UHS Makeup Keep-Fill line equipped with a manual isolation valve, check valve, and flow restricting orifice. The Post-DBA UHS Makeup Keep-Fill line delivers water from the safety-related ESW System return line to the UHS Makeup Water System to maintain the UHS Makeup Water System full due to leakage during Post-DBA.

Following the receipt of a safety injection signal, operating procedures and low water level alarms associated with the UHS cooling tower basin will direct operators to start the UHS Makeup Water pumps. The pumps are started manually against the closed motor operated discharge isolation valves. Automatic air release vents are provided to release air at the discharge of the pump to expel any entrapped air. The minimum recirculation valves are opened to ensure that minimum flow required for the pumps is achieved. Once minimum flow through the pumps is achieved, the pump discharge isolation valves are fully opened and the recirculation valves are closed. Once the UHS Makeup Water pumps are started manually, subsequent operations are accomplished automatically.

The UHS Makeup Water System will incorporate additional design provisions that minimize the effect of hydraulic transients on the functional capability and integrity of the system components. These design features include slow stroke motor-operated isolation valves, automatic air release valves, a UHS Makeup Keep-Fill line and Post-DBA UHS Makeup Keep-Fill line to maintain the system full at all times, valve control and interlock features that ensure correct valve line up prior to pump start, and discharge isolation valves that open and close with pump start and stop signals.

Editors Note: See FSAR Insert 2 for Section 9.2.5.5

pipe will be sloped to prevent water ponding inside the pipe after any system fill and subsequent draining.

In addition, reconciliation of the site-specific climatology data has demonstrated that the ESWS cooling tower performance maintains the ESWS temperature below the required 95° F (35° C).}

9.2.5.6 Inspection and Testing Requirements

{The UHS Makeup Water System components, including the safety-related motor operated isolation valves for makeup and blowdown are procured and fabricated in accordance with the quality requirements for safety-related ASME Section III, Class 3 systems, structures and components to ensure compliance with approved specifications and design documents.

Installation of individual components and overall system construction are inspected to verify the as-built condition is in accordance with approved drawings. A preoperational test is performed, as described in Section 14.2.14, to verify the ability of the UHS Makeup Water System to perform its safety function.

Inservice inspection of the UHS Makeup Water System including piping, valves, pumps and components is performed as identified in FSAR Section 6.6, in accordance with the requirements of ASME Section XI and ASME OM Code. The installation and design of the UHS Makeup Water System provides accessibility, as described in FSAR Section 6.6.2, for the performance of periodic inservice inspection. The frequency of inservice inspection, via flow or pressure tests, for buried piping segments is described in FSAR Section 6.6.4, to ensure system integrity beyond the ASME Section XI code requirement.

Inservice testing of the UHS Makeup Water System including valves, pumps and components, is performed as identified in FSAR Section 3.9.6, in accordance with the requirements of the ASME OM Code. The installation and design of the UHS Makeup Water System provides accessibility for the performance of periodic inservice testing. Periodic testing of safety-related equipment verifies its structural and leak-tight integrity, availability, and ability to fulfill its safety function. Inservice inspection and testing are in accordance with ASME Section XI and ASME OM Code requirements. Refer to U.S EPR FSAR Tier 2 Chapter 16, Generic Technical Specification Surveillance Requirements (SR) 3.7.19.5 and SR 3.7.19.6 for surveillance requirements that verify continued operability of the UHS Makeup Water System.

Pursuant to the recommendations included in Generic Letter 89-13, the design of safety-related portions of the UHS makeup system considers the potential for capability and performance degradation and subsequent system failure due to silting, erosion, corrosion, protective coating failure, and the presence of organisms that subject the system to microbiological influenced corrosion as well as macro fouling.

In order to identify and reduce the incidence of flow blockage problems from biofouling near the intake structure and traveling screens, the UHS Makeup intake pipes, traveling screens and pump forebay will be inspected once per refueling cycle to ensure that there is no biological growth, sedimentation and corrosion. Inspection will be performed by either scuba divers or by dewatering the intake structure or by other comparable methods, and fouling accumulations will be removed.

UHS Makeup Water System supplies makeup water to the UHS starting 72 hours post accident only. Silting, erosion, corrosion and biological fouling are a concern for normally operating wet

However, the UHS Makeup Water System piping is super austenitic stainless steel, which is compatible with the Chesapeake Bay brackish water to prevent erosion and corrosion pitting. Silting and biological fouling are prevented by quarterly flushing of the system.

systems. These are of minimal concern for the UHS Makeup Water System, which is normally in a dry layup condition. Water for periodic testing is chemically treated to mitigate biofouling and the system is completely drained after each periodic testing.

Routine inspection and maintenance activities as established by the plant procedures identify any degradation and correct performance gaps due to corrosion, erosion, protective coating failure, silting and biofouling.

Finally, in accordance with U.S. EPR Surveillance Requirements provided in Chapter 16, periodic surveillance testing of the system, including the safety-related isolation valves, provides continuing assurance of the system's ongoing capability to perform its design function. Surveillance testing includes system performance tests and inspection of individual components, as appropriate to their importance to system function and their tendency to degrade due to their operational conditions and environment.

The inspection and testing provisions described above are subject to programmatic requirements and procedural controls as described in Section 13.5.}

{Safety-related Instrumentation and Control (I&C) functions of the UHS Makeup Water System as well as the local supporting power systems equipment will be allocated to the Safety Automation System (SAS). The Human Machine Interface (HMI) for monitoring and operating the safety-related equipment associated with the UHS Makeup Water System is the Safety Information and Control System (SICS) and the Process Information and Control System (PICS). The PICS displays and workstations are located in the Main Control Room and Remote Shutdown Station.}

Editors Note: Markups shown in black (text boxes, strike-throughs and black text) are markups from RAI 325 Q07.05-01.

9.2.5.7 Instrumentation Applications

{Instrumentation is applied to the ESWS Normal Makeup Water System, UHS Makeup Water System and blowdown, to the extent necessary to monitor essential component conditions and verify real time system performance. This includes limit switches that provide remote position indication for valves. It also includes pressure, temperature and differential pressure sensors that provide local and remote display of system pressure, temperature and flow. In addition, temperature and amperage sensors can be used for indirect flow indication and direct indication of component status. Radiation monitors in the ESWS will detect a potential radiation leak and provide an alarm in the main control room for operator action.

System performance can also be assessed using level indication on the cooling tower basins.

9.2.5.7.1 System Monitoring

The UHS Makeup Water System is monitored for the following parameters.

- Traveling screen differential level
- Fluid flow rate and pressure downstream of the UHS Makeup Water pumps
- Differential pressure at the UHS Makeup Water pump discharge strainer
- Bearing Temperature of the UHS Makeup Water pump
- MOV position status
- UHS Makeup Water pump operating status (energized/de-energized)

9.2.5.7.2 System Alarms

- High differential level across traveling screen
- High pressure at UHS Makeup Water pump discharge
- Low pressure at UHS Makeup Water pump discharge
- Low flow at UHS Makeup Water pump discharge

Editors Note: Markups shown in black (text boxes, strike through, and black text) are markups from RAI 325 Q07.05-01.

- High differential pressure across the pump discharge strainer
- High bearing temperature of UHS Makeup Water pump

9.2.5.7.3 UHS Makeup Water System Safety Related I&C Functions

Upon the receipt of a safety injection signal, the following valves will receive a signal to automatically align to their post accident position as indicated.

- ~~UHS Makeup Water pump discharge strainer blowdown isolation valve (closed)~~ ESWS emergency makeup water isolation valve (opened)
- ~~UHS Makeup Water pump initial fill isolation valve (closed)~~ ESWS normal makeup water isolation valve (closed)
- ~~UHS Makeup Water pump discharge isolation valve (closed)~~ ESWS normal and emergency blowdown isolation valves (closed)
- ~~UHS Makeup Water pump recirculation valve (closed)~~

Editors Note: Markup below shown in black (text boxes, strike through, and black text) is deleted by this RAI Response RAI 325 Q07.05-1.

~~In the event following an SIS signal the following manual actions for system filling take place:~~

9.2.5.7.3.1 ~~Manual Actuation for system filling~~ Operator Action to fill the UHS Cooling Tower Basin

~~Upon the receipt of a safety injection signal and at established time prior to 72 hours, following actions are performed manually.~~ After the receipt of a safety injection signal, operator action is required to start the UHS makeup water pump manually from the main control room to maintain UHS tower water level.

- ~~The ESW Emergency Makeup isolation discharge valves are closed~~
- ~~The UHS Makeup Water pumps are started~~

There are no interlocks or permissives for starting the UHS makeup water pumps. This is a departure from the U.S. EPR FSAR, Tier 2 Table 9.2.1-3, which lists a pump start permissive associated with "Cooling tower basin water level Lo-Lo-Lo."

9.2.5.7.3.2 Auto Actuation after Pump Start Manually.

The following ~~actions~~ take place automatically after the start of the UHS Makeup Water pump

- The UHS Makeup Water pump ~~re-circulation~~ minimum flow recirculation valves are opened
- The UHS Makeup Water pump discharge isolation valves are opened ~~to pre-determined position to fill the pipe~~ after the flow through the UHS Makeup Water pump exceeds the minimum pump flow required.
- ~~When the line is filled, ESW Emergency Makeup isolation discharge valve is opened~~
- ~~The UHS Makeup Water pump discharge valve is fully opened~~
- The UHS Makeup Water pump minimum flow recirculation ~~valve is closed~~ valves are closes and modulates as needed to maintain minimum flow.

~~9.2.5.7.3.2 UHS Makeup Actuation from SIS Coincident with Low Water Level in the Cooling Tower Basin.~~

~~In the event of no manual action for system priming, following an SIS signal and coincident low water level the following actions take place automatically.~~

- ~~The ESW Emergency Makeup isolation discharge valve is closed~~
- ~~The UHS Makeup Water pumps are started~~
- ~~The UHS Makeup Water pump re-circulation valves are opened~~
- ~~The UHS Makeup Water pump discharge isolation valves are opened to pre-determined position to fill the pipe~~
- ~~When the line is filled, ESW Emergency Makeup isolation discharge valve is opened~~

Editors Note: See Markup Response to RAI 325 Q07.05-1

- ~~The UHS Makeup Water pump discharge valve is fully opened~~

The following valves are automatically re-aligned in response to a pump start/stop

- UHS Makeup Water pump discharge isolation valves (Open/Closed)
- UHS Makeup Water pump re-circulation valves (Open/Closed)
- ~~ESW Emergency Makeup isolation valve (Open/Closed)}~~

9.2.5.8 References

{**NCDC, 2008.** U.S. Department of Commerce, National Oceanographic and Atmospheric Administration, National Climatic Data Center, Integrated Surface Hourly Observations Dataset, Patuxent River Naval Air Station, Maryland, 1978-2007, purchased 2008.

PAXNAS. Hourly Surface Observations, 1975-2006, obtained from the National Climatic Data Center.}

9.2.6 Condensate Storage Facilities

No departures or supplements.

9.2.7 Seal Water Supply System

No departures or supplements.

9.2.8 Safety Chilled Water System

No departures or supplements.

9.2.9 Raw Water Supply System

The U. S. EPR FSAR includes the following conceptual information and COL Item in Section 9.2.9:

> [[The RWSS contains water received from a site-specific natural source and supplies it directly to the points of use where it may be further processed by the receiving plant systems. The raw water for demineralized water, potable water, fire protection, and ultimate heat sink (UHS) normal makeup is preprocessed as required by filtration, reverse osmosis, chemical treatment, and desalinization of brackish raw water sources prior to use.]] The conceptual design of the RWSS is shown in Figure 9.2.9 -1—[[Conceptual Site-Specific Raw Water Supply System]].
>
> [[The RWSS does not provide any safety-related function. There is no connection between raw water and the components of other systems that have the potential to contain radiological contamination.]]
>
> [[Non-safety-related normal makeup water is provided to the UHS cooling tower basins as clean (desalinated) water.]]

The RWSS and the design requirements of the RWSS are site-specific and will be addressed by the COL applicant.

The conceptual information and COL Item are addressed as follows:

Editors Note: See FSAR Insert 3 for Figure 9.2-3

Figure 9.2-3— {Normal Makeup, Emergency Makeup, Blowdown & Chemical Treatment}

(Typical for each of 4 independent trains)

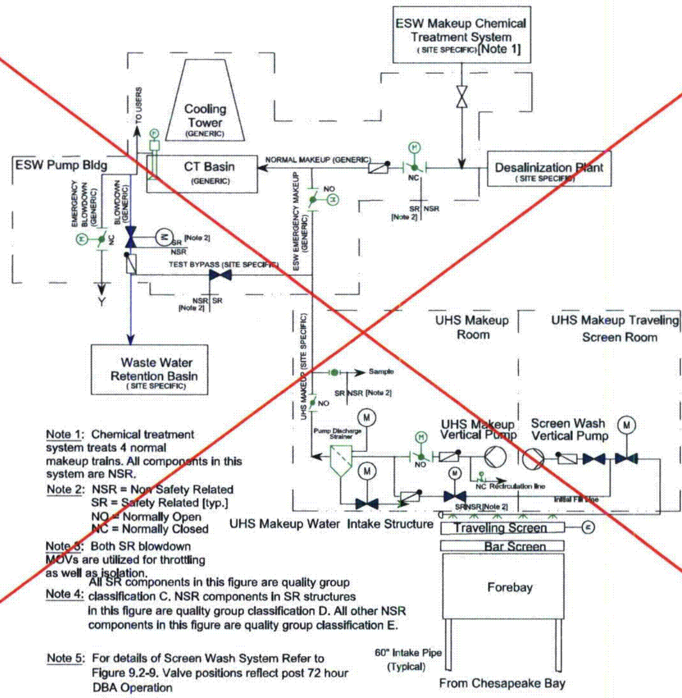
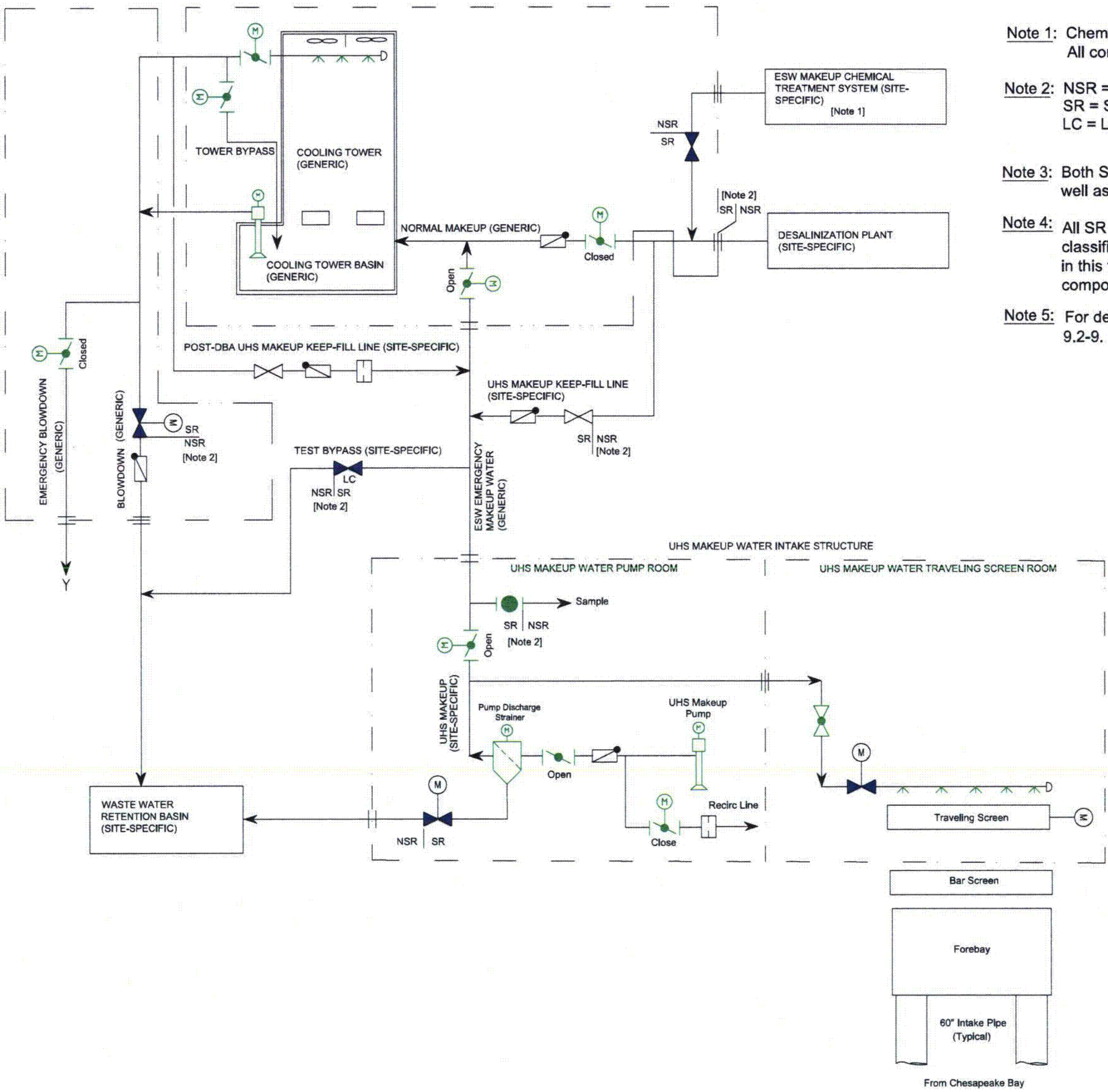


Figure 9.2-3 -{Normal Makeup, UHS Makeup, and Blowdown}

(Typical for each of 4 independent trains)
Valve positions reflect post 72 hour DBA operation



Note 1: Chemical treatment system treats 4 normal makeup trains. All components in this system are NSR

Note 2: NSR = Non Safety Related
SR = Safety Related [typ.]
LC = Lock Closed

Note 3: Both SR blowdown MOVs are utilized for throttling as well as isolation.

Note 4: All SR components in this figure are quality group classification C. NSR components in SR structures in this figure are quality group classification D. All other NSR components in this figure are quality group classification E.

Note 5: For details of the UHS Makeup Water System see Figure 9.2-9.

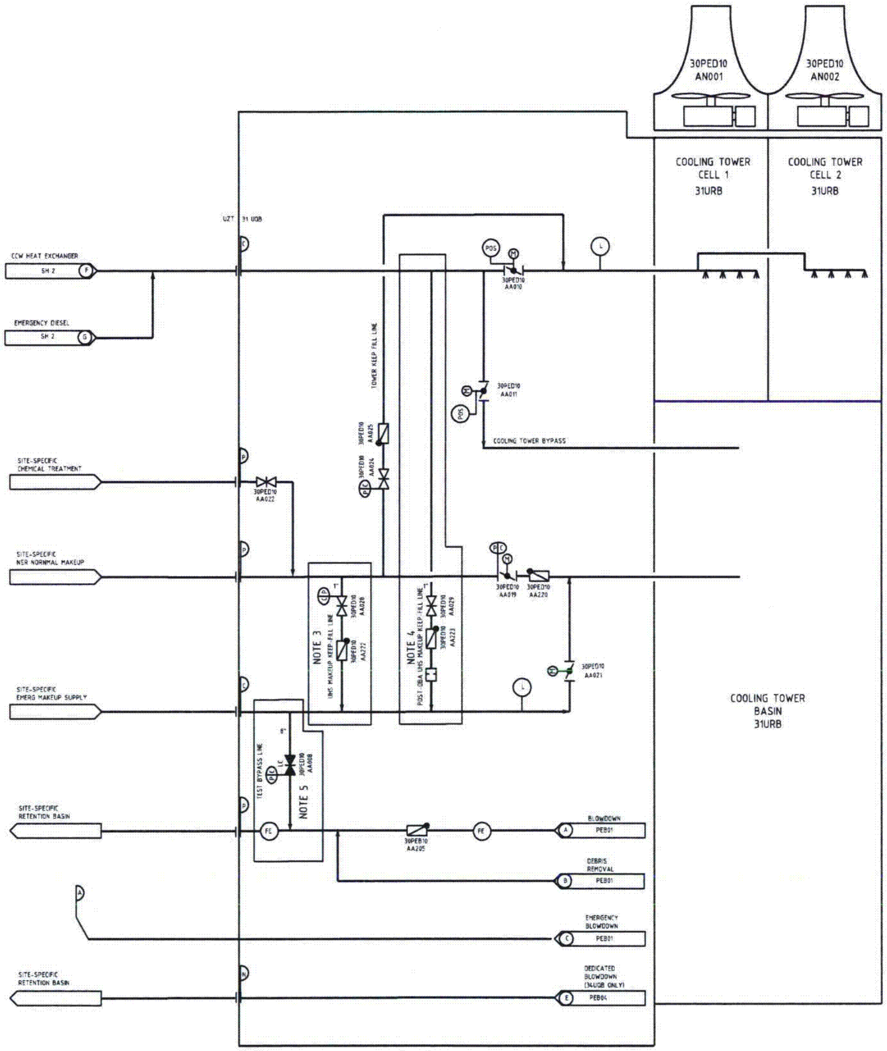
Insert 3 for COLA Figure 9.2-3

9.3 PROCESS AUXILIARIES

Editors Note:
See FSAR Insert 4 for
New Figure 9.2-10

This section of the U.S. EPR FSAR is incorporated by reference.

FIGURE 9.2-10 – {ESWS EMERGENCY MAKEUP WATER SYSTEM PIPING AND INSTRUMENTATION DIAGRAM}



NOTE:

1. THIS DRAWING IS A GENERAL REPRESENTATION OF U.S. EPR FSAR FIGURES 9.2.1-1 & 9.2.5-1 OF TRAIN 1. TRAINS 2, 3, AND 4 ARE SIMILAR, EXCEPT WHERE NOTED.
2. DEFINITION FOR ABBREVIATION USED IN THIS DIAGRAM.
   - PEB - ESSENTIAL SERVICE WATER PIPING SYSTEM
   - PED - ESSENTIAL SERVICE WATER RECIRCULATING SYSTEM
   - 31UQB - ESSENTIAL SERVICE WATER PUMP BUILDING, DIVISION 1.
   - UZT - OUT DOOR AREA.
   - 31URB - ESSENTIAL SERVICE WATER COOLING TOWER STRUCTURE, DIVISION 1.
   - LC - LOCK CLOSED
3. THE UHS MAKEUP KEEP-FILL LINE PROVIDES DESALINATED WATER FROM NON-SAFETY-RELATED MAKEUP WATER SYSTEM TO KEEP THE EMERGENCY MAKEUP WATER SYSTEM LINE FULL DURING PLANT NORMAL OPERATION.
4. THE POST-DBA UHS MAKEUP KEEP-FILL LINE PROVIDES MAKEUP WATER FROM SAFETY-RELATED ESW SYSTEM RETURN LINE TO KEEP THE EMERGENCY MAKEUP WATER SYSTEM LINE FULL DURING POST DBA. CONDITION.
5. THE UHS MAKEUP WATER SYSTEM TEST BYPASS LINE PROVIDES CAPABILITY TO BYPASS FILLING OF THE UHS TOWER WITH SALINE WATER DURING MAKEUP WATER SYSTEM TESTING.

LEGEND:

- GATE VALVE
- CHECK VALVE
- BUTTERFLY VALVE
- LEVEL
- FLOW
- REDUCER/INCREASER
- ELECTRIC MOTOR, GENERAL

N	E	NSC
P	E	NSC
A	C	I
C	C	I
DESIGN AREA	SSC QUALITY GROUP	SSC SEISMIC CLASS

Insert 4 for COLA Figure 9.2-10

This page is provided for reference only

14.2.13 References

No departures or supplements.

14.2.14 COL Applicant Site-Specific Tests

This section is added to provide a location for COL applicants to list site-specific startup tests.

14.2.14.1 {Raw Water Supply System

1. OBJECTIVE

   a. To demonstrate the ability of the Raw Water Supply System and desalinization plant to process raw water and provide a reliable supply for the demineralized water, fire protection, essential service water normal makeup and potable water systems, under normal plant operating conditions.

2. PREREQUISITES

   Raw Water Supply System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

   a. Construction activities on the Raw Water Supply System (RWSS) have been completed.

   b. RWSS instrumentation has been calibrated and is functional for performance of the following test.

   c. Support system required for operation of the RWSS is complete and functional.

   d. The RWSS intake is being maintained at the water level specified in the design documents.

   e. The RWSS flow balance has been performed.

   f. Construction activities on the desalinization plant have been completed.

   g. Desalinization plant instrumentation is complete and functional and has been calibrated.

   h. Support systems required for operation of the desalinization plant are complete and functional.

   i. Test instrumentation is available and calibrated.

   j. The desalinization plant flow balance has been completed.

   k. RWSS inspection and testing requirements have been completed as described in Section 9.2.9.5.

3. TEST METHOD

   a. Verify desalinization plant component manual control from all locations is per design requirements.

   b. Verify automatic controls function at design setpoints.

This page is provided for reference only

c. Verify desalinization plant pumps and components (e.g., filters, reverse osmosis devices, needle valves, etc) meet individual design requirements.

d. Verify system flow and output quality meets design specifications.

e. Verify the desalinization plant provides design rated flow to all systems that are supplied by the desalinated water transfer pumps.

f. Verify standby desalinated water transfer pumps start on low discharge pressure or a trip of the running pump.

g. Verify desalinated water transfer pumps trip on low desalinated water tank level.

4. DATA REQUIRED

a. Pump operating data.

b. Setpoints at which alarms and interlocks occur.

5. ACCEPTANCE CRITERIA

a. The desalinization plant components can be manually controlled from all locations per design requirements.

b. The automatic controls function such that system performance meets or exceeds the design requirements.

c. The individual design requirements for the desalination plant pumps and equipment (e.g., filters, reverse osmosis devices, automatic valves, etc) have been met.

d. The RWSS and desalination systems design specifications for system flow and output quality have been met.

e. The desalinization plant provides design rated flow to all systems that are supplied by the desalinated water pumps.

f. The standby desalinated water transfer pumps start on low discharge pressure or a trip of the running pump.

g. The desalinated water transfer pumps trip on low desalinated water tank level.

h. The desalinization plant operates as described in Section 9.2.9.

i. The desalinization plant output water quality is in compliance with design specifications.

14.2.14.2 Ultimate Heat Sink (UHS) Makeup Water System

1. OBJECTIVES

a. To demonstrate the ability of the UHS Makeup Water System to supply makeup water as designed.

b. To establish baseline performance data for future equipment surveillance and ISI.

c. Verify electrical independence and redundancy of safety-related power supplies.

d. To demonstrate the ability of the traveling screens to be manually rotated and manually washed off.

2. PREREQUISITES

Ultimate Heat sink (UHS) Makeup Water System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

the UHS Makeup Keep-Fill line, and the Post-DBA UHS Makeup Keep-Fill line,

a. Construction activities on the UHS Makeup Water System, including the test bypass line, have been completed and the system is functional.

b. Construction activities on the ESW blowdown lines from the ESW system isolation MOVs to the retention basin have been completed, and the lines are isolable from the ESWS and functional.

c. Hydrostatic/leak testing of the UHS Makeup Water System, including the test bypass line, has been completed with satisfactory results.

d. UHS Makeup Water System instrumentation is functional and has been calibrated.

e. Support systems required for operation of the UHS Makeup Water System are complete and functional.

f. Test instrumentation available and calibrated.

3. TEST METHOD

a. Verify that each UHS Makeup Water System division can be operated from the main control room and the remote shutdown panel.

b. Verify safety-related automatic valves (MOVs, SOVs, AOVs) respond as designed to each of the applicable open/close signal sources, including time delay circuitry.

c. Verify valve position indication.

d. Verify position response of valves to loss of motive power.

e. Verify air release valves operate as designed on pump start.

f. Verify each discharge strainer operates as designed.

g. Verify that makeup flow through the test bypass line demonstrates the system can deliver the minimum Technical Specification flow rate to the ESWS Cooling Tower.

h. Verify alarms, interlocks, display instrumentation, and status lights function as designed.

i. Verify head versus flow characteristics for each UHS Makeup Water System pump at design conditions.

j. Verify valve performance data, where required.

Editors Note:
for Item number n, o, and p refer to RAI 337 Q14.02.58 response markup.

k. Verify electrical independence and redundancy of power supplies for safety-related functions.

Editors Note: Markups shown in black (text boxes, strike-through and black text) are markups from RAI 330 Q09.02.05-20.

l. Verify ability of the traveling screens to be ~~manually~~ rotated and ~~manually~~ washed off. based on the design differential level across the traveling screens and timer basis.

m. Verify adequate system alignment to perform back flushing.

q. Verify that makeup flow through the UHS Makeup Keep-Fill line demonstrates the system can deliver the minimum system flow rate to the UHS Makeup Water system due to leakage specified by the owner.

r. Verify that makeup flow through the Post-DBA UHS Makeup Keep-Fill line demonstrates the system can deliver the minimum system flow rate to the UHS Makeup Water system due to leakage specified by the owner.

4. DATA REQUIRED

a. Record alarm, interlocks, and control setpoints.

b. Record pump head versus flow and operating data.

c. Record valve performance parameters (e.g., stroke time, developed thrust) for baseline diagnostic testing data.

d. Record valve position upon loss of motive power and valve position indication data.

5. ACCEPTANCE CRITERIA

a. Each UHS Makeup Water System division can be operated, as designed, from the main control room and the remote shutdown panel.

b. The safety-related automatic valves (MOVs, SOVs, AOVs) respond to the designated open/close signal sources, including time delay circuitry, as designed.

c. The valve position indications properly indicate actual valve position.

d. The position response of valves to loss of motive power is correct.

e. The air release valves operate as designed on pump start.

f. The discharge strainers perform as designed.

g. The makeup flow through the test bypass line demonstrates the system can deliver the minimum Technical Specification flow rate to the ESWS Cooling Tower.

h. The alarms, interlocks, display instrumentation, and status lights function as designed.

i. The head versus flow characteristics for each UHS Makeup Water System pump at design conditions has been met.

j. The valves meet performance data where required.

~~k. The UHS Makeup Water System operates per design and as described in Section 9.2.5.~~

Editors Note: Markups shown in black (text boxes, strick-throughs and black text) are markups from RAI 337 Q09.14.02-58

k. ~~l.~~ Safety-related components meet electrical independence and redundancy requirements.

l. ~~m.~~ Traveling screens can be manually rotated and manually washed off.

m. ~~n.~~ Backflushing can be performed via the discharge strainer debris removal line.

Editors Note: for Item number n, o, and ,p refer to RAI 337 Q14.02.58 response markup

q. The makeup flow through the UHS Makeup Keep-Fill line demonstrates the system can deliver the minimum system makeup flow rate to the UHS Makeup Water system due to leakage specified by the owner.

r. The makeup flow through the Post-DBA UHS Makeup Keep-Fill line demonstrates the system can deliver the minimum system makeup flow rate to the UHS Makeup Water System due to leakage, as specified by the owner.

14.2.14.3 Essential Service Water Blowdown System

1. OBJECTIVES

1.1 DEPARTURES

017885

CC3-09-0359 This Departure Report includes deviations in the CCNPP Unit 3 COL application FSAR from the information in the U.S. EPR FSAR, pursuant to 10 CFR Part 52. The U.S. EPR Design Certification Application is currently under review with the NRC. However, for the purposes of evaluating these deviations from the information in the U.S. EPR FSAR, the guidance provided in Regulatory Guide 1.206, Section C.IV.3.3, has been utilized.

The following Departures are described and evaluated in detail in this report:

CC3-12-0039 1. Maximum Tilt Settlement (across the basemat)

2. Maximum Annual Average Atmospheric Dispersion Factor (limiting sector),

3. Accident Atmospheric Dispersion Factor (0-2 hour, Low Population Zone)

4. Shear Wave Velocity

5. Coefficient of Static Friction

6. Soil Column Beneath the Nuclear Island, ESWB and EPGB

CC3-10-0202 7. Generic Technical Specifications and Bases - Setpoint Control Program

CC3-11-0137 ~~8. Test bypass line - UHS Makeup Water system~~

~~9.~~ 8. Human Performance Monitoring

9. Post-DBA UHS Keep-Fill line - UHS Makeup Water System

1.1.1 MAXIMUM TILT SETTLEMENT (ACROSS THE BASEMAT)

017882

CC3-09-0359, CC3-12-0039 Affected U.S. EPR FSAR Sections: Tier 1 Table 5.0-1, Tier 2 Table 2.1-1, Tier 2 Section 2.5.4.10.2

Summary of Departure:

CC3-11-0059 The U.S. EPR FSAR identifies a maximum differential settlement of 1/2 inch in 50 feet (i.e., 1/1200) in any direction across the basemat. The estimated settlement values for the Emergency Generating Building foundations and Essential Service Water System Cooling Tower foundations exceed the U.S. EPR FSAR value.

Extent/Scope of Departure:

This Departure is identified in CCNPP Unit 3 FSAR Table 2.0-1 and Section 2.5.4.10.2.

Departure Justification:

CC3-12-0039 The estimated site-specific tilt settlement for the Emergency Power Generating Buildings and Essential Service Water System Cooling Towers (based on a fully flexible basemat) are 1/1166 and 1/845 (approximately ½ and ¾ inch in 50 ft), respectively, as stated in FSAR Section 2.5.4.10.2.

CC3-12-0039 As described in Sections FSAR 3.8.5.5.2 and 3.8.5.5.3, finite element analyses were performed for the Emergency Power Generating Buildings and Essential Service Water System Cooling Towers using soil springs representing the CCNPP Unit 3 site. For each structure, the tilt settlement within the confines of the building periphery is shown to be substantially less than the 1/1200 (1/2 inch in 50 feet) requirement of the U.S. EPR FSAR.

~~1.1.8 Test Bypass Valve and piping for ESW Emergency Makeup piping design~~ ~~024642~~

CC3-11-0137
CC3-11-0137 ~~Affected U.S. EPR FSAR Sections: Tier 2 Figure 9.2.5-1~~

CC3-11-0137 **~~Summary of Departure:~~**

CC3-11-0137 ~~The U.S. EPR FSAR Figure 9.2.5-1 does not contain a provision to conduct full flow testing of UHS Makeup Water System, without transferring brackish water into the cooling tower basin. A test bypass line was added to the ESW Emergency Makeup Water System standard design to conduct full flow testing of the UHS Makeup Water System. Therefore, the U.S EPR ESW system is modified to enable surveillance testing requirements.~~

CC3-11-0137 **~~Scope/Extent of Departure:~~**

CC3-11-0137 ~~This Departure is identified in the CCNPP Unit 3 FSAR Section 1.8.2, 9.2.5.3 and Figure 9.2-3.~~

CC3-11-0137 **~~Departure Justification:~~**

CC3-11-0137 ~~The CCNPP Unit 3 site-specific UHS Makeup Water System provides Chesapeake Bay brackish water to the UHS tower basin no later than72 hours after a DBA. The US EPR FSAR requires the COLA applicant to perform surveillance testing to ensure that UHS makeup water system can provide adequate flow to the UHS tower basin during post DBA. To ensure that makeup water can be provided to the UHS tower basin post-DBA, flow testing is performed every two years on UHS Makeup Water System. Thus, to not contaminate the UHS cooling tower basin during full flow testing with Chesapeake Bay water, a test bypass line is provided to divert the brackish water from the ESW Emergency Makeup System from entering the UHS tower basin. A safety related test bypass line manual isolation valve is provided, and is closed after testing to maintain the pressure boundary of the UHS Makeup Water System.~~

CC3-11-0137 **~~Departure Evaluation:~~**

CC3-11-0137 ~~The UHS Makeup Water System maintains the pressure boundary through the safety related test bypass manual isolation valve.~~

CC3-11-0137 ~~Therefore this Departure does not:~~

1. ~~Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific FSAR;~~
2. ~~Result in more than a minimal increase in the likelihood of occurrence of malfunction of a structure, system, or component (SSC) important to safety and previously evaluated in the plant-specific FSAR;~~
3. ~~Result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific FSAR;~~
4. ~~Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific FSAR;~~
5. ~~Create a possibility for an accident of a different type than any evaluated previously in the plant-specific FSAR;~~
6. ~~Create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific FSAR;~~

7. Result in a design basis limit for a fission product barrier as described in the plantspecific FSAR being exceeded or altered; or

8. Result in a departure from a method of evaluation described in the plant-specific FSAR used in establishing the design bases or in the safety analyses.

CC3-11-0137 This Departure does not affect resolution of a severe accident issue identified in the plant-specific FSAR.

1.1.8

CC3-11-0137 Therefore, this Departure has no safety significance.

1.1.9 Human Performance Monitoring

025765

CC3-11-0182
CC3-11-0137 Affected US EPR FSAR Sections: Tier 2 Section 18.12

CC3-11-0137 **Summary of Departure:**

CC3-11-0137 The U.S. EPR FSAR Section 18.12 provides an outline and criteria of the Human Performance Monitoring Program (HPM) performed throughout the life of the plant. The corresponding CCNPP Unit 3 FSAR Chapter 18.12 replaces the U.S. EPR FSAR program with the UniStar Nuclear Energy (UNE) Human Performance Monitoring Program.

The UniStar Nuclear Energy Human Performance Monitoring Program contains recent operating experience, which further refines requirements and interfaces for continuous improvement of human performance. The key elements of the program are:

- Scoping of the performance monitoring strategy,
- Development and documentation of the human performance monitoring strategy for implementation and continuous improvement across organizations,
- Structuring the program such that,
  - Human actions are monitored commensurate with their safety importance
  - Feedback of information and corrective actions are accomplished in a timely manner
  - Degradation in performance can be detected and corrected before plant safety is compromised
- Close approximation of performance data, in actual conditions, when measurable human performance information is not available,
- Ensuring the Corrective Action Program (CAP) is effectively incorporating identification, resolution and trending of human performance issues, in support of other programs such as self-assessments and peer reviews.

The Corrective Action Program is in accordance with the UniStar Nuclear Quality Assurance Program, which provides UniStar requirements for the documentation, review, resolution and tracking and trending of Human Performance issues throughout the life of the plant. The use of an operational focus index provides a rigorous approach to trend operator's day to day activities. The operation focus index leaves the flexibility, to include additional data sets in addition to industrial norms to ensure the rigor of issue analysis.

CC3-11-0137 **Scope/Extent of Departure:**

CC3-11-0137 This Departure is identified in CCNPP Unit 3 PART 2 FSAR, Section 18.12.

CC3-11-0137 **Departure Justification:**

CC3-11-0137 The US EPR FSAR Section 18.12 is replaced with UniStar Nuclear Energy's Human Performance Monitoring Program. This aligns with UNE's corporate strategy for HPM requirements and Corrective Action Program. The underlining objective of the UNE HPM strategy is to ensure no significant safety degradation occurs because of any changes that are made in the plant and to verify that the conclusions that have been drawn from the human performance evaluation remain valid over the life of the plant. UniStar Nuclear Energy's HPM Program meets the requirements of NUREG-0711, therefore, it is an acceptable replacement for the U.S. EPR HPM Program.

CC3-11-0137 **Departure Evaluation:**

CC3-11-0137 This Departure is associated with the details of implementing the Human Performance Monitoring Program. The additions, deletions, and changes to the US EPR FSAR Section 18.12 have been evaluated and determined to not adversely affect the safety function of any SSC, procedures or analysis of the plant. Accordingly, this departure does not:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific FSAR;
2. Result in more than a minimal increase in the likelihood of occurrence of malfunction of a structure, system, or component (SSC) important to safety and previously evaluated in the plant-specific FSAR;
3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific FSAR;
4. Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific FSAR;
5. Create a possibility for an accident of a different type than any evaluated previously in the plant-specific FSAR;
6. Create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific FSAR;
7. Result in a design basis limit for a fission product barrier as described in the plantspecific FSAR being exceeded or altered; or Result in a departure from a method of evaluation described in the plant-specific FSAR used in establishing the design bases or in the safety analyses;
8. CC3-11-0137 This Departure does not affect resolution of a severe accident issue identified in the plant-specific FSAR.

CC3-11-0137 Therefore, this Departure has no safety significance.

Editors Note:
See Insert 5 for COLA Part 7, New Section 1.1.9

1.1.9 Post-DBA UHS Makeup Keep-Fill Piping, Valves, and flow restricting orifice for the UHS Makeup Water System design

Affected U.S. EPR FSAR Sections: Tier 2 Figure 9.2.5-1

Summary of Departure:

The U.S. EPR Figure 9.2.5-1 does not contain a provision to compensate for the UHS Makeup Water System leakage and maintain the water level in the piping full at all times. The Post-DBA UHS Makeup Keep-Fill line is added to deliver makeup water to the UHS Makeup Water System to compensate for the leakage loss due to pressure boundary isolation valves, and to keep the UHS Makeup Water System piping full of water at all times. Therefore, the ESWS Emergency Makeup Water line piping and the ESW System return line piping are modified.

Scope/Extent of Departure:

This departure is identified in CCNPP Unit 3 Part 2 FSAR, Sections 1.8.2, 9.2.5.5, Figure 9.2-3, and Figure 9.2-10.

Departure Justification:

The CCNPP Unit 3 site-specific UHS Makeup Water System wet layup configuration will require the system piping to be full of water at all times to ensure system readiness. And, makeup water is required to compensate for UHS Makeup Water System boundary valve leakage. In order to maintain water level in the piping and provide makeup water to offset valve seat leakage, a tie in point between ESWS Emergency Makeup Water piping and the ESW System return piping is provided. This tie in allows makeup water to enter the UHS Makeup Water System piping.

Departure Evaluation:

The UHS Makeup Water System pressure boundary is maintained through the safety-related Post-DBA UHS Makeup Keep-Fill line check valve.

Therefore this Departure does not:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific FSAR;

2. Result in more than a minimal increase in the likelihood of occurrence of malfunction of a structure, system, or component (SSC) important to safety and previously evaluated in the plant-specific FSAR;

3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific FSAR;

4. Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific FSAR;

5. Create a possibility for an accident of a different type than any evaluated previously in the plant-specific FSAR;

6. Create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific FSAR;

7. Result in a design basis limit for a fission product barrier as described in the plant specific FSAR being exceeded or altered; or

8. Result in a departure from a method of evaluation described in the plant-specific FSAR used in establishing the design bases or in the safety analyses.

This Departure does not affect resolution of a severe accident issue identified in the plant-specific FSAR.

Therefore, this Departure has no safety significance.

Table 2.4-22— {Ultimate Heat Sink Makeup Water System Inspections, Tests, Analyses, and Acceptance Criteria}
(Page 6 of 8)

	Commitment Wording	Inspection, Test, or Analysis	Acceptance Criteria
10	Pressure boundary welds in portions of the UHS Makeup Water System piping as shown as ASME Code Section III in Figure 2.4-1 are in accordance with ASME Code Section III.	Inspections of pressure boundary welds verify that welding is performed in accordance with ASME Code Section III requirements.	ASME Code Section III Data Reports exist and conclude that pressure boundary welding for portions of the UHS Makeup Water System piping shown as ASME Code Section III in Figure 2.4-1 has been performed in accordance with ASME Code Section III.
11	Portions of the UHS Makeup Water System components shown as ASME Code Section III inFigure 2.4-1 retain their pressure boundary integrity at their design pressure.	Hydrostatic tests will be performed on the system.	For portions of the UHS Makeup Water System components shown as ASME Code Section III in Figure 2.4-1, ASME Code Section III Data Reports exist and conclude that hydrostatic test results comply with ASME Code Section III requirements.
12	Portions the UHS Makeup Water System piping shown as ASME Code Section III in Figure 2.4-1 retain their pressure boundary integrity at their design pressure.	Hydrostatic tests will be performed on the system.	For portions of the UHS Makeup Water System piping shown as ASME Code Section III in Figure 2.4-1, ASME Code Section III Data Reports exist and conclude that hydrostatic test results comply with ASME Code Section III requirements.
13	The materials utilized in the equipment and piping of the UHS Makeup Water System are compatible with its as-built environmental conditions and brackish water.	a. An analysis of the materials utilized in the as-built equipment and piping will be performed. b. An inspection of the as-built piping will be conducted.	a. A report exists and concludes that the materials utilized in the equipment and piping installed in the UHS Makeup Water System and is compatible with its as-built environmental conditions and brackish water. b. The as-built above ground and buried piping for the UHS Makeup Water System is composed of super stainless austenitic steel.
14	The UHS Makeup Water Intake Structure bar screens have a large enough face area that potential blockage to the point of preventing the minimum required flow through them is not a concern.	a. Analyses will be performed of the equipment. b. Inspections will be performed to verify the as-built equipment is installed as specified on the construction drawings and deviations from the approved design have been reconciled.	a. A report exists and concludes that the face area for the as-built UHS Makeup Water Intake Structure bar screens is sufficient to permit the minimum required flow in the event of worst-case blockage of the screens. 1. A report exists and concludes that the as-built face area for the as-built UHS Makeup Water Intake Structure bar screens agrees with construction drawings and deviations from the approved design are reconciled.

Table 2.4-22— {Ultimate Heat Sink Makeup Water System Inspections, Tests, Analyses, and Acceptance Criteria}

(Page 8 of 8)

	Commitment Wording	Inspection, Test, or Analysis	Acceptance Criteria
22	a. Each UHS Makeup Water Intake Structure dual flow traveling screen is designed to be manually rotated, if needed, following a loss of motive power or failure of its electric motor drive. b. Each UHS Makeup Water Intake Structure dual flow traveling screen is designed to be manually cleaned using an external water source following a loss of its screen wash system.	a. Tests will be performed on each UHS Makeup Water Intake Structure dual flow traveling screen to verify it can be manually rotated upon a loss of motive power or failure of its electric motor drive. b. Tests will be performed on each UHS Makeup Water Intake Structure dual flow traveling screen to verify it can be manually cleaned using an external water source following a loss of its screen wash system.	a. Test reports exist and conclude that upon a simulated loss of motive power or failure of its electric motor drive, each UHS Makeup Water Intake Structure dual flow traveling screen can be manually rotated. b. Test reports exist and conclude that upon a simulated loss of its screen wash system, each UHS Makeup Water Intake Structure dual flow traveling screen can be manually cleaned using an external water source.

Editors Note: See Insert for ITAAC Table 2.4-22, Items #23 and #24.

Insert for ITAAC Table 2.4-22, Items #23 and #24

	Commitment Wording	Inspection, Test, or Analysis	Acceptance Criteria
23	Each division of the UHS Makeup Water System has a UHS Makeup Keep-Fill line as shown in Figure 2.4-3, that allows makeup water flow from the normal makeup water system to the UHS Makeup Water System during normal plant operation.	Tests of the as-built system will be conducted.	The as-built UHS Makeup Keep-Fill line for each division of the UHS Makeup Water System, as shown in Figure 2.4-3, allows makeup water flow from normal makeup system to the UHS Makeup Water System during normal plant operation.
24	Each division of the UHS Makeup Water System has a Post-DBA UHS Makeup Keep-Fill line as shown in Figure 2.4-3, that allows makeup water flow from the ESW System return line to the UHS Makeup Water System during post DBA plant operation.	Tests of the as-built system will be conducted.	a. The as-built Post DBA UHS Makeup Keep-Fill line for each division of the UHS Makeup Water System, as shown in Figure 2.4-3, allows makeup water flow from ESW System return line to the UHS Makeup Water System during post DBA plant operation.
			b. A report exists and concludes that, the flow restricting orifice listed in Table 2.4-29, restricts makeup flow within the specified design value/system limit.

Post-DBA UHS Makeup Keep-Fill Line Orifice Valve Train 1	--	ESWS Pump Room	Class 3	Open	I
Post-DBA UHS Makeup Keep-Fill Line Check Valve Train 1	30PED10AA223	ESWS Pump Room	Class 3	Open-Close	I
Post-DBA UHS Makeup Keep-Fill Line Isolation Valve Train 1	30PED10AA029	ESWS Pump Room	Class 3	Open	I
UHS Makeup Keep-Fill Line Isolation Valve Train 1	30PED10AA028	ESWS Pump Room	Class 3	Open	I
UHS Makeup Keep-Fill Line Check Valve Train 1	30PED10AA222	ESWS Pump Room	Class 3	Open-Close	I

Table 2.4-29— {Ultimate Heat Sink (UHS) Makeup Water System Component Mechanical Design}
(Page 1 of 4)

Component Description	Component Tag Number	Component Location	ASME Code	Function	Seismic Category
UHS Makeup Water Pump Train 1	30PED10 AP001 A	UHS Makeup Pump Room	Class 3	Run	I
UHS Makeup Water Pump Discharge Check Valve Train 1	30PED10 AA201 A	UHS Makeup Pump Room	Class 3	Open – Close	I
UHS Makeup Water Pump Discharge Isolation Valve Train 1	30PED10 AA001 A	UHS Makeup Pump Room	Class 3	Open	I
UHS Makeup Water Pump Minimum Flow Valve Train 1	30PED10 AA002 A	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Discharge Strainer Train 1	30PED10 AT001 A	UHS Makeup Pump Room	Class 3	Run	I
UHS Makeup Water Pump Discharge Strainer Blowdown Isolation Valve Train 1	30PED10AA006 A	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 1	Later	UHS Makeup Pump Room	Class 3	Open	I
UHS Makeup Water Pump Initial Fill Check Valve Train 1	Later	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Initial Fill Isolation Valve Train 1	Later	UHS Makeup Pump Room	Class 3	Close	I
Piping and Manual Valves Train 1	Later	UHS Makeup Intake Structure	Class 3 / B31.1	Pressure Boundary	I / II
Buried Piping Train 1	Later	Yard Area	Class 3	Pressure Boundary	I
Air Release/Vacuum Breaker Valve Train 1	Later	UHS Makeup Pump Room	Class 3	Open – Close	I
UHS Makeup Water Dual Flow Traveling Screen Train 1	Later	UHS Makeup Intake Structure	N/A	Run	II
UHS Makeup Water Intake Structure Bar Screen Train 1	Later	UHS Makeup Intake Structure	N/A	—	II
UHS Makeup Water Screen Wash Pump Train1	Later	UHS Makeup Intake Structure	B31.1	Run	II
UHS Makeup Water Pump Train 2	30PED20 AP001 A	UHS Makeup Pump Room	Class 3	Run	I
UHS Makeup Water Pump Discharge Check Valve Train 2	30PED20 AA201 A	UHS Makeup Pump Room	Class 3	Open – Close	I
UHS Makeup Water Pump Discharge Isolation Valve Train 2	30PED20 AA001 A	UHS Makeup Pump Room	Class 3	Open	I

Table 2.4-29— {Ultimate Heat Sink (UHS) Makeup Water System Component Mechanical Design}
(Page 2 of 4)

Component Description	Component Tag Number	Component Location	ASME Code	Function	Seismic Category
UHS Makeup Water Pump Minimum Flow Valve Train 2	30PED20 AA002 A	UHS Makeup Pump Room	Class 3	Close	I
Post-DBA UHS Makeup Keep-Fill Line Orifice Valve Train 2	--	ESWS Pump Room	Class 3	Open	I
Post-DBA UHS Makeup Keep-Fill Line Check Valve Train 2	30PED20AA223	ESWS Pump Room	Class 3	Open-Close	I
Post-DBA UHS Makeup Keep-Fill Line Isolation Valve Train 2	30PED20AA029	ESWS Pump Room	Class 3	Open	I
UHS Makeup Keep-Fill Line Isolation Valve Train 2	30PED20AA028	ESWS Pump Room	Class 3	Open	I
UHS Makeup Keep-Fill Line Check Valve Train 2	30PED20AA222	ESWS Pump Room	Class 3	Open-Close	I
UHS Makeup Water Pump Discharge Strainer Train 2	30PED20 AT001 A	UHS Makeup Pump Room	Class 3	Run	I
UHS Makeup Water Pump Discharge Strainer Blowdown Isolation Valve Train 2	30PED20AA006 A	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 2	Later	UHS Makeup Pump Room	Class 3	Open	I
UHS Makeup Water Pump Initial Fill Check Valve Train 2	Later	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Initial Fill Isolation Valve Train 2	Later	UHS Makeup Pump Room	Class 3	Close	I
Piping and Manual Valves Train 2	Later	UHS Makeup Intake Structure	Class 3 / B31.1	Pressure Boundary	I / II
Buried Piping Train 2	Later	Yard Area	Class 3	Pressure Boundary	I
Air Release/Vacuum Breaker Valves Train 2	Later	UHS Makeup Pump Room	Class 3	Open – Close	I
UHS Makeup Water Dual Flow Traveling Screen Train 2	Later	UHS Makeup Intake Structure	N/A	Run	II
UHS Makeup Water Intake Structure Bar Screen Train 2	Later	UHS Makeup Intake Structure	N/A	—	II
UHS Makeup Water Screen Wash Pump Train 2	Later	UHS Makeup Intake Structure	B31.1	Run	II
UHS Makeup Water Pump Train 3	30PED30 AP001 A	UHS Makeup Pump Room	Class 3	Run	I
UHS Makeup Water Pump Discharge Check Valve Train 3	30PED30 AA201 A	UHS Makeup Pump Room	Class 3	Open – Close	I
UHS Makeup Water Pump Discharge Isolation Valve Train 3	30PED30 AA001 A	UHS Makeup Pump Room	Class 3	Open	I
UHS Makeup Water Pump Minimum Flow Valve Train 3	30PED30 AA002 A	UHS Makeup Pump Room	Class 3	Close	I
Post-DBA UHS Makeup Keep-Fill Line Orifice Valve Train 3	--	ESWS Pump Room	Class 3	Open	I
Post-DBA UHS Makeup Keep-Fill Line Check Valve Train 3	30PED30AA223	ESWS Pump Room	Class 3	Open-Close	I
Post-DBA UHS Makeup Keep-Fill Line Isolation Valve Train 3	30PED30AA029	ESWS Pump Room	Class 3	Open	I
UHS Makeup Keep-Fill Line Isolation Valve Train 3	30PED30AA028	ESWS Pump Room	Class 3	Open	I
UHS Makeup Keep-Fill Line Check Valve Train 3	30PED30AA222	ESWS Pump Room	Class 3	Open-Close	I
UHS Makeup Water Pump Discharge Strainer Train 3	30PED30 AT001 A	UHS Makeup Pump Room	Class 3	Run	I

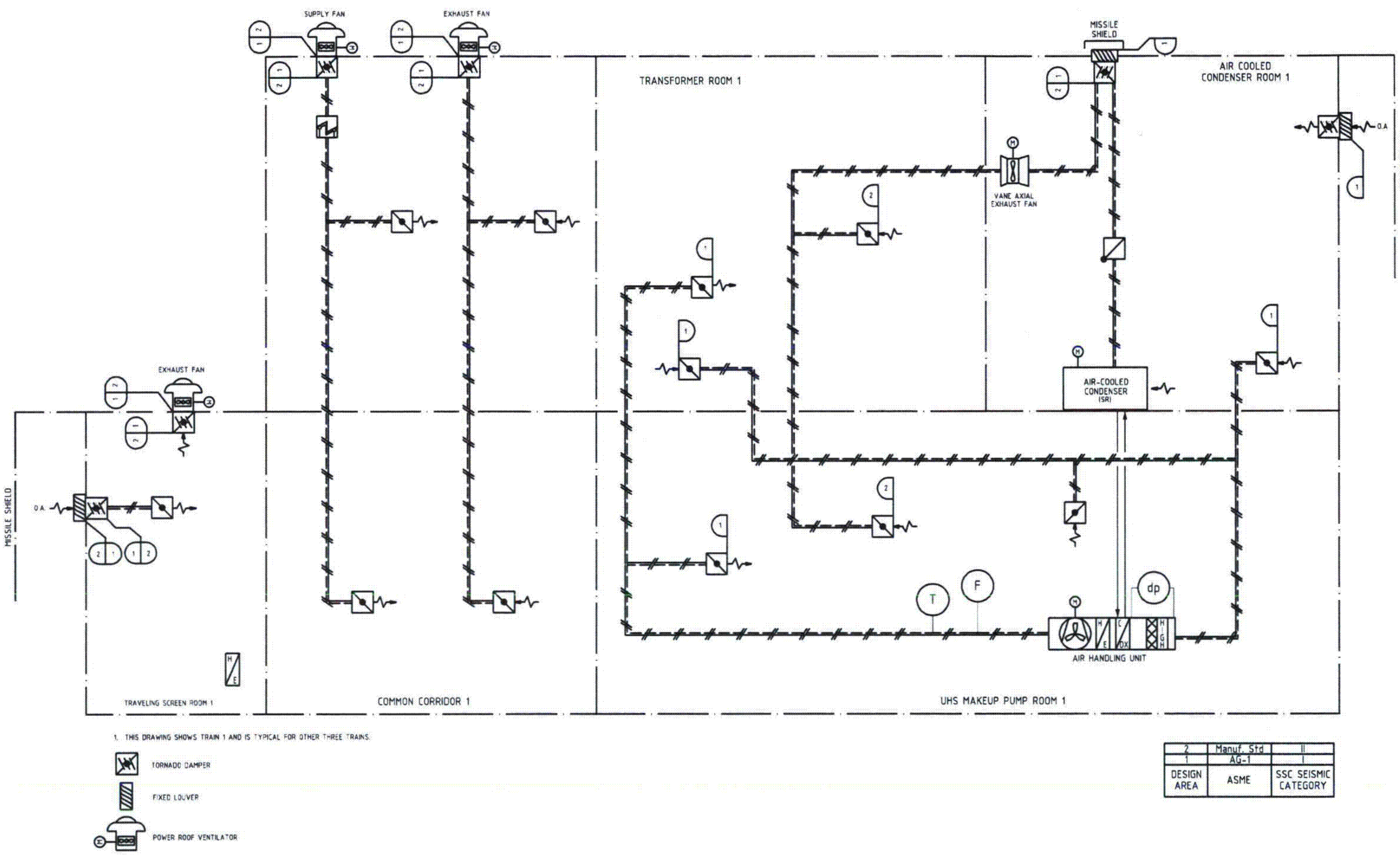
Table 2.4-29— {Ultimate Heat Sink (UHS) Makeup Water System Component Mechanical Design}

(Page 3 of 4)

Component Description	Component Tag Number	Component Location	ASME Code	Function	Seismic Category
UHS Makeup Water Pump Discharge Strainer Blowdown Isolation Valve Train 3	30PED30AA006 A	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 3	Later	UHS Makeup Pump Room	Class 3	Open	I
UHS Makeup Water Pump Initial Fill Check Valve Train 3	Later	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Initial Fill Isolation Valve Train 3	Later	UHS Makeup Pump Room	Class 3	Close	I
Piping and Manual Valves Train 3	Later	UHS Makeup Intake Structure	Class 3 / B31.1	Pressure Boundary	I / II
Buried Piping Train 3	Later	Yard Area	Class 3	Pressure Boundary	I
Air Release/Vacuum Breaker Valves Train 3	Later	UHS Makeup Pump Room	Class 3	Open – Close	I
UHS Makeup Water Dual Flow Traveling Screen Train 3	Later	UHS Makeup Intake Structure	N/A	Run	II
UHS Makeup Water Intake Structure Bar Screen Train 3	Later	UHS Makeup Intake Structure	N/A	—	II
UHS Makeup Water Screen Wash Pump Train 3	Later	UHS Makeup Intake Structure	B31.1	Run	II
UHS Makeup Water Pump Train 4	30PED40 AP001 A	UHS Makeup Pump Room	Class 3	Run	I
UHS Makeup Water Pump Discharge Check Valve Train 4	30PED40 AA201 A	UHS Makeup Pump Room	Class 3	Open – Close	I
UHS Makeup Water Pump Discharge Isolation Valve Train 4	30PED40 AA001 A	UHS Makeup Pump Room	Class 3	Open	I
UHS Makeup Water Pump Minimum Flow Valve Train 4	30PED40 AA002 A	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Discharge Strainer Train 4	30PED40 AT001 A	UHS Makeup Pump Room	Class 3	Run	I
UHS Makeup Water Pump Discharge Strainer Blowdown Isolation Valve Train 4	30PED40AA006 A	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 4	Later	UHS Makeup Pump Room	Class 3	Open	I
Post-DBA UHS Makeup Keep-Fill Line Orifice Valve Train 4	--	ESWS Pump Room	Class 3	Open	I
Post-DBA UHS Makeup Keep-Fill Line Check Valve Train 4	30PED40AA223	ESWS Pump Room	Class 3	Open-Close	I
Post-DBA UHS Makeup Keep-Fill Line Isolation Valve Train 4	30PED40AA029	ESWS Pump Room	Class 3	Open	I
UHS Makeup Keep-Fill Line Isolation Valve Train 4	30PED40AA028	ESWS Pump Room	Class 3	Open	I
UHS Makeup Keep-Fill Line Check Valve Train 4	30PED40AA222	ESWS Pump Room	Class 3	Open-Close	I

Enclosure 2
UN#12-154
page 50 of 51

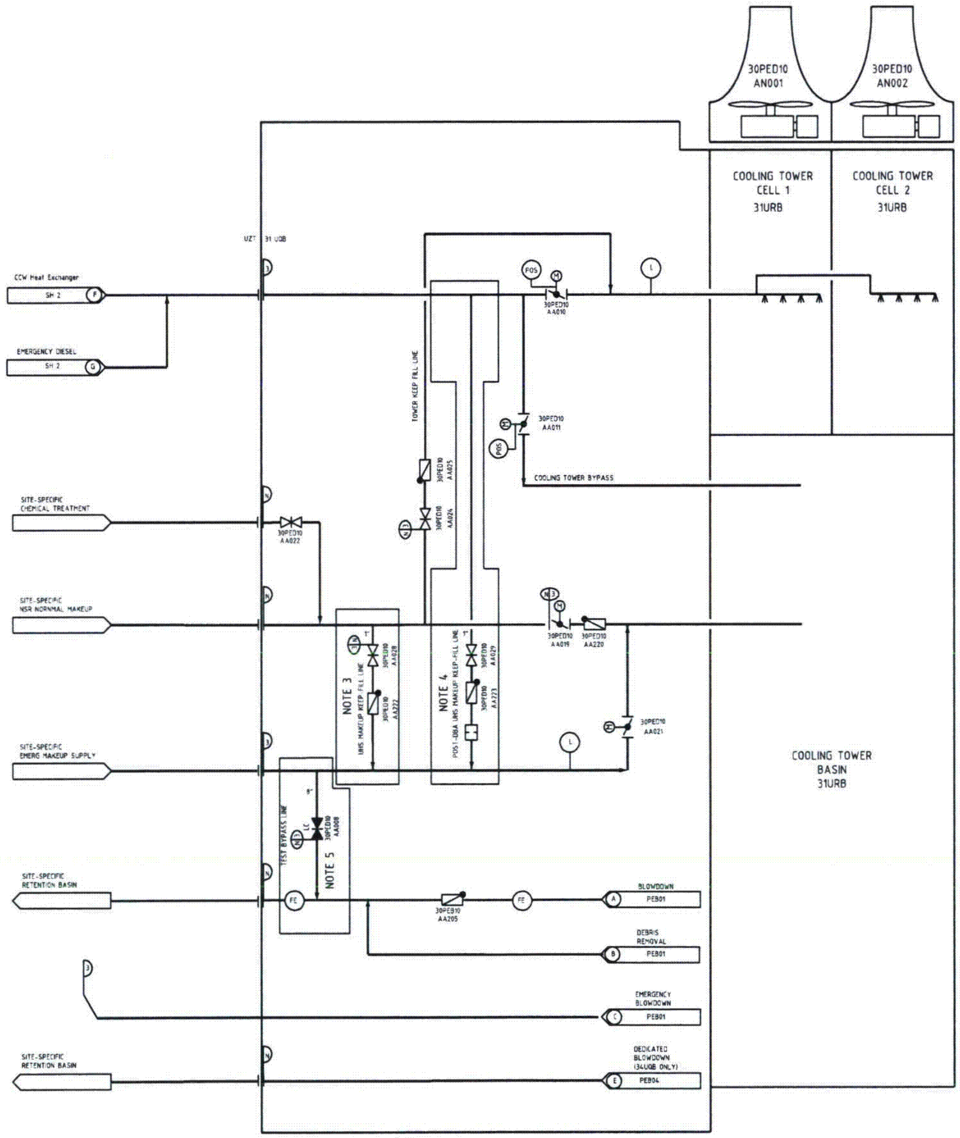
Figure 2.4-2— {UHS Makeup Water Intake Structure Ventilation System Functional Arrangement}



2	Manuf. Std	II
1	AG-1	I
DESIGN AREA	ASME	SSC SEISMIC CATEGORY

Editors Note: See Part 10 ITAAC Insert for New Figure 2.4-3 - {ESWS Emergency Makeup Water System Functional Arrangement} next page 1-115.

FIGURE 2.4-3 - {ESWS EMERGENCY MAKEUP WATER SYSTEM FUNCTIONAL ARRANGEMENT}



NOTE:

1. THIS DRAWING IS A GENERAL REPRESENTATION OF U.S. EPR FSAR FIGURES 9.2.1-1 & 9.2.5-1 OF TRAIN 1. TRAINS 2, 3, AND 4 ARE SIMILAR, EXCEPT WHERE NOTED.
2. DEFINITION FOR ABBREVIATION USED IN THIS DIAGRAM.
   - PEB - ESSENTIAL SERVICE WATER PIPING SYSTEM
   - PED - ESSENTIAL SERVICE WATER RECIRCULATING SYSTEM
   - 31UQB - ESSENTIAL SERVICE WATER PUMP BUILDING, DIVISION 1.
   - UZT - OUT DOOR AREA.
   - 31URB - ESSENTIAL SERVICE WATER COOLING TOWER STRUCTURE, DIVISION 1.
   - LC - LOCK CLOSED
3. THE UHS MAKEUP KEEP-FILL LINE PROVIDES DESALINATED WATER FROM NON-SAFETY RELATED MAKEUP WATER SYSTEM TO KEEP THE EMERGENCY MAKEUP WATER SYSTEM LINE FULL DURING PLANT NORMAL OPERATION..
4. THE POST-DBA UHS MAKEUP KEEP-FILL LINE PROVIDES MAKEUP WATER FROM SAFETY-RELATED ESW SYSTEM RETURN LINE TO KEEP THE EMERGENCY MAKEUP WATER SYSTEM LINE FULL DURING POST DBA.
5. THE UHS MAKEUP WATER SYSTEM TEST BYPASS LINE PROVIDES CAPABILITY TO FILLING OF THE UHS TOWER WITH SALINE WATER DURING MAKEUP WATER SYSTEM TESTING.

LEGEND:

- GATE VALVE
- CHECK VALVE
- BUTTERFLY VALVE
- LEVEL
- FLOW
- REDUCER/INCREASER
- ELECTRIC MOTOR, GENERAL

N	N/A	II
3	3	I
DESIGN AREA	ASME CLASS	SSC SEISMIC CLASS

Insert for ITAAC Figure 2.4-3

Enclosure 3

Table of Changes to CCNPP Unit 3 COLA
Associated with the Response to RAI No. 332,
Question 09.02.05-22
Calvert Cliffs Nuclear Power Plant, Unit 3

Table of Changes to CCNPP Unit 3 COLA

Associated with the Response to RAI No. 332

Change ID #	Subsection	Type of Change	Description of Change
Part 2 – FSAR			
10-0009	9.2.5	Incorporate COLA markups associated with the response to RAI 182, Q03.02.02-1[3]	The response to RAI 182, Q03.02.02-1 modifies and adds information associated with the UHS Makeup Water Intake Structure Traveling Screens.
11-0094	9.2.5.1	Incorporate COLA markups associated with the response to RAI 286, Q09.02.05-18[4]	The response to RAI 286, Q09.02.05-18 updates flow values.
11-0137	9.2.5.2.3	Incorporate COLA markups associated with the response to RAI 279, Q09.02.05-7[5]	The response to RAI 340, Q03.09.06-4 modifies a valve number.
11-0096	9.2.5.1	Incorporate COLA markups associated with the response to RAI 277, Q09.02.01-1[6]	The response to RAI 277, Q09.02.01-1 adds UHS makeup pump information.
12-0142	9.2.5.3.2	Incorporate COLA markups associated with the response to RAI 340, Q03.09.06-4[7]	The response to RAI 277, Q09.02.01-1 adds UHS makeup pump information.

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[3] UniStar Nuclear Energy Letter UN#10-062, from Greg Gibson to Document Control Desk, U.S. NRC, Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3, RAI 182, System Quality Group Classification, dated March 10, 2010

[4] UniStar Nuclear Energy Letter UN#11-122, from Greg Gibson to Document Control Desk, U.S. NRC, Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3, RAI 286, Ultimate Heat Sink, dated April 6, 2011

[5] UniStar Nuclear Energy Letter UN#11-230, from Greg Gibson to Document Control Desk, U.S. NRC, Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3, RAI 279, Ultimate Heat Sink, dated August 19, 2011

[6] UniStar Nuclear Energy Letter UN#11-123, from Greg Gibson to Document Control Desk, U.S. NRC, Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3, RAI 277, Essential Service Water System, dated April 1, 2011

[7] UniStar Nuclear Energy Letter UN#12-077, from Mark T. Finley to Document Control Desk, U.S. NRC, Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3, RAI 340, Functional Design Qualification and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints, dated July 26, 2012

Change ID #	Subsection	Type of Change	Description of Change
12-0242	1.8.2, 2.4.11.6, 9.2.5.1, 9.2.5.2.3, 9.2.5.2.4, 9.2.5.3.2, 9.2.5.4.1, 9.2.5.4.2, 9.2.5.5, 9.2.5.6, 9.2.5.7.3.1, 9.2.5.7.3.2, 14.2.14.2, Table 3.9-2, Table 3.10-1, and Figure 9.2-3 and 9.2-10	Incorporate COLA markups associated with the response to RAI 332, Q09.02.05-22	The response to RAI 332, Q09.02.05-22 modifies and adds information associated with UHS piping.
Part 7 – Departures			
11-0137	1.1.8	Incorporate COLA markups associated with the response to RAI 279, Q09.02.05-7[4]	The response to RAI 279, Q09.02.05-7 added a departure for Test Bypass Valve and pipin for ESW Emergency Makeup piping design
12-0242	1.1.8, 1.1.9	Incorporate COLA markups associated with the response to RAI 332, Q09.02.05-22	The response to RAI 332, Q09.02.05-22 deletes departure 1.1.8 and adds new Departure 1.1.9 for Post-DBA UHS Makeup Keep-Fill piping, Valves and flow restricting orifice for the UHS Makeup Water System design, and deletes departure 1.1.8 for the test Bypass Valve and piping for ESW Emergency Makeup piping design.
Part 10 – Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) and ITAAC Closure			
12-0242	Appendix B, ITAAC Table 2.4-22, Table 2.4-29, and Figure 2.4-3	Incorporate COLA markups associated with the response to RAI 332, Q09.02.05-22	The response to RAI 332, Q09.02.05-22 adds new ITAAC Table 2.4-22 Items 23 and 24, adds new information to Table 2.4-29, and adds ITAAC Figure 2.4-3.