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10 CFR 50.4
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May 17, 2013

UN#13-068

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

Subject: UniStar Nuclear Energy, NRC Docket No. 52-016
Supplemental 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#12-154 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 332, Ultimate Heat Sink, dated December 20, 2012

The purpose of this letter is to provide a supplemental response to the request for additional information (RAI) identified in the NRC e-mail correspondence to UniStar Nuclear Energy (UNE), dated January 20, 2012 (Reference 1). This RAI addresses the Ultimate Heat Sink, as discussed in Section 9.2.5 of the 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 9.

Reference 2, dated December 20, 2012, provided our original response to RAI 332, Question 09.02.05-22. The Reference 2 response provided the design approach for the CCNPP Unit 3 Ultimate Heat Sink (UHS) Makeup Layup.

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This supplement is motivated by feedback on the Reference 2 response provided at a public meeting on March 18, 2013. The feedback consisted of eight comments on the Reference 2 response and thirteen comments on the Reference 2 COLA markups.

Enclosure 1 provides our response to the feedback items and includes revisions to the original responses, and revised COLA content. A Licensing Basis Document Change Request has been initiated to incorporate these changes into a future revision of the COLA.

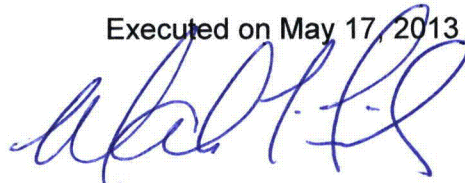
Enclosure 2 provides an updated table of changes to the CCNPP Unit 3 COLA associated with the RAI 332, Question 09.02.05-22 supplemental response.

This supplemental 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 May 17, 2013



Mark T. Finley

- Enclosures:
- 1) Supplemental 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) Table of Changes to CCNPP Unit 3 COLA Associated with the Supplemental 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)
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UN#13-068

Enclosure 1

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

NRC Feedback Comments on Initial Response

UniStar Nuclear Energy (UNE) submitted the response to Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 3 RAI 332, Question 09.02.05-22 in UNE letter UN#12-154¹. The NRC provided feedback on this response at a public meeting on March 18, 2013, requesting the supplemental information denoted below.

Response Comments

- **Page 5/8** - 'safety related manual valve and safety related check valve' – should have General Design Criterion (GDC) 2 statement in response.
- **Page 5/8** - 'normal makeup' – describe nonsafety-related (NSR) keep fill interactions during testing and accident conditions. Is manual action required to isolate the nonsafety-related (NSR) keep fill?
- **Page 5/8** - NSR keep fill – is a pressure gauge needed to verify that NSR keep fill is working correctly?
- **Page 5/8 and 6/8** - "has significant margin" (several places); should provide design numbers to support this statement.
- **Page 5/8** - 627 gpm vs 648 gpm (Final Safety Analysis Report (FSAR) markup page 14) - which is correct?
- **Page 6/8** - 'system will be completely flushed' – does the system have any dead legs, if so, how are dead legs addressed?
- **Page 7/8** - 'will be closed' (2 places) - consider adding 'automatically'.
- **Page 7/8** - 'level alarm will direct the operator' – U.S. EPR FSAR has levels 1, 2, 3, 4 – which level is the alarm?

FSAR Markup Comments

- **Page 3/51 and 14/51** - 627 gpm vs. 648 gpm?
- **Page 9/51** - AA008 – does this need to be added to Table 3.10-1?
- **Page 16/51** - did not see the safety-related (SR) new keep fill system from essential service water system (ESWS) described in FSAR Section 9.2.1.
- **Page 25/51** - 'full at all times' – provided the keep fill pumps are running – consider clarification.
- **Page 25/51** - min. recirculation valves are opened/closed – consider adding 'auto' open, 'auto' close.
- **Page 25/51** - effects of water hammer discussion now missing with the new added text. Consider adding this back.
- **Page 25/51** - SR keep fill – consider describing the ESWS interactions during accidents.
- **Page 31/51** - dashes for buildings - missing some labels.
- **Page 31/51** - SR/NSR boundary moved from AA019.
- **Page 31/51** – Ultimate Heat Sink (UHS) makeup keep fill (gate and check) – in which building are these valves located?
- **Page 31/51** - consider adding pressure gauge to verify keep NSR fill is operating correctly.
- **Page 33/51** - consider adding the ESWS keep fill to the FSAR figure.

¹ UniStar Nuclear Energy Letter UN#12-154, 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 332, Ultimate Heat Sink, dated December 20, 2012

- **Page 51/51** - note 5, "to filling of the UHS tower with saline" vs. "to bypass of the UHS tower with saline" Consider correcting to bypass saline.

Response to NRC Feedback on Initial Responses

Page 5/8 – 'safety related manual valve and safety related check valve' – should have General Design Criterion (GDC) 2 statement in response.

Response: The response to RAI 332, Q09.02.05-22 Item #1 has been updated to include the GDC 2 statement for the UHS Makeup Keep-Fill Line and Post-Design Basis Accident (Post-DBA) UHS Makeup Keep-Fill Line Safety-Related manual isolation valves and check valves.

Page 5/8 – 'normal makeup' – describe NSR keep fill interactions during testing and accident conditions. Is manual action required to isolate the NSR keep fill?

Response: The response to RAI 332, Q09.02.05-22 Item #1 has been updated to describe the NSR UHS Makeup Keep-Fill line interactions during system testing and accident conditions. Manual action is not required for isolation of the UHS Makeup Keep-Fill line system during normal operation, testing or accident conditions.

Page 5/8 – NSR keep fill – is a pressure gauge needed to verify that NSR keep fill is working correctly?

Response: The response to RAI 332, Q09.02.05-22 Item #1 has been updated to describe how the NSR UHS Makeup Keep-Fill line and SR Post-DBA UHS Makeup Keep-Fill line interact with the Normal Makeup Water System and ESWS. A pressure gauge is not required to verify the UHS Makeup Keep-Fill systems are working correctly, since level instrumentation and alarms are provided in the UHS Makeup Water System, near the isolation valve at the basin, to ensure the system is maintained full. The UHS Makeup Water System full level alarm is included in the CCNPP Unit 3 FSAR Table 9.2-2 - UHS Makeup Water System Alarm Summary.

Page 5/8 and 6/8- "has significant margin" (several places); should provide design numbers to support this statement.

Response: The pump design flow data for the Normal Makeup water pumps will be developed during detail design and will account for leakages from the UHS Makeup Water System. ESWS pump and UHS Makeup Water System pump flow rate margins are included in this response.

Page 5/8 - 627 gpm vs 648 gpm (FSAR markup page 14) - which is correct?

Response: The response to RAI 332, Q09.02.05-22 Item #1, both values are updated to correct the site-specific Normal Makeup Water System flow rate to the ESWS basin to 660 gpm.

Page 6/8 – 'system will be completely flushed' – does the system have any dead legs, if so, how are dead legs addressed?

Response: The response to RAI 332, Q09.02.05-22 Item #3 has been updated to add, "Low point drain connections are provided to empty trapped water in any dead legs in the system."

Page 7/8 – 'will be closed' (2 places) - consider adding automatically.

Response: The response to RAI 332, Q09.02.05-22 Item #5 has been updated to add the word "automatically" for operation of ESWS blowdown, valve seepage, UHS Makeup Water System isolation valve and ESWS emergency water system valves.

Page 7/8 – 'level alarm will direct the operator' – U.S. EPR FSAR has levels 1, 2, 3, 4 – which level is the alarm?

Response: The response to RAI 332, Q09.02.05-22 Item #5 has been updated to describe the required operator action, after the receipt of a safety injection signal alarm, to start the UHS makeup water system pumps prior to the UHS cooling tower basin water level alarm Min 4 (U.S. EPR FSAR Table 9.2.1-3 - Alarm Cooling Tower Basin Water Level, Lo-Lo-Lo-Lo (Min 4)).

Responses to FSAR Feedback

Page 3/51 and 14/51 – 627 gpm vs. 648 gpm?

Response: FSAR Subsection 2.4.11.6 markup has been updated to correct both values of the site-specific NSR Normal Makeup Water System flow rate to the ESWS basin to approximately 660 GPM (margin was added for leakage).

Page 9/51 – AA008 – does this need to be added to Table 3.10-1?

Response: FSAR Table 3.10-1, Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment, has been updated to include the UHS Makeup Water Test Bypass Isolation Valve 30PED10/20/30/40 AA008 for each train.

Page 16/51 – did not see the SR new keep fill system from ESWS described in FSAR Section 9.2.1.

Response: FSAR Subsection 9.2.1.3 has been updated to include the description of the Post-DBA UHS Makeup Water Keep-Fill line.

Page 25/51 – ‘full at all times’ – provided the keep fill pumps are running – consider clarification.

Response: FSAR Subsection 9.2.5.5 has been updated to include the phrase “function that operates with the Normal Makeup Water pumps running” and “function that operates with the ESWS pumps running” for operation of the UHS Makeup Keep-Fill and Post DBA UHS Makeup Keep-Fill lines.

Page 25/51 – min. recirculation valves are opened/closed – consider adding ‘auto’ open, ‘auto’ close.

Response: FSAR Subsection 9.2.5.5 has been updated to include the word “automatically” in regards to operation of the UHS Makeup Water pump isolation valves, recirculation valves, and traveling screen wash isolation valves.

Page 25/51 – effects of water hammer discussion now missing with the new added text. Consider adding this back.

Response: The UHS Makeup Water System is a wet layup configuration. It is filled with water, tested and ready to operate during normal operation and prior to an accident. One of the advantages of changing the UHS Makeup Water System from dry layup to wet layup configuration is eliminating the water hammer effect during post-accident system startup. With wet layup configuration water hammer is not a concern.

Page 25/51 - SR keep fill – consider describing the ESWS interactions during accidents.

Response: FSAR Subsection 9.2.5.2.3 has been updated to describe the ESWS interaction with the UHS Makeup Water System. During post-DBA operation the UHS Makeup Water System becomes operational and pressurized by the makeup water pump. The safety-related check valve installed in the Post-DBA UHS Makeup Keep-Fill line prevents UHS (emergency) makeup water from flowing into the ESWS. Depending up on the differential pressure between the two systems, during Post-DBA operation, the safety-related check valve may or may not allow ESW water to flow to UHS Makeup Water System. Any ESWS makeup water that flows

through the Post-DBA UHS Keep-Fill line will return to the cooling tower basin. There is no loss of water from the ESWS during this operation.

Page 31/51 – dashes for buildings - missing some labels.

Response: FSAR Figure 9.2-3 has been updated to incorporate missing dashed borderlines and labels for the ESW building borderlines. Solid lines are added to the figure to represent buildings and dashed lines are to show the separation of site-specific components and generic plant components.

Page 31/51 – SR/NSR boundary moved from AA019.

Response: FSAR Figure 9.2-3 has been updated to relocate the SR/NSR boundary to the upstream side of the motor-operated site-specific NSR Normal Makeup Water System isolation valve 30PED10/20/30/40 AA019.

Page 31/51- UHS makeup keep fill (gate and check) – in which building are these valves located?

Response: FSAR Figure 9.2-3 has been updated to show the UHS Makeup Water Keep-Fill gate valve and check valve located inside the ESW building. All ESW System and UHS Makeup Water System valves are located inside the ESW building including the Test Bypass and Post-DBA UHS Makeup Keep-Fill lines.

Page 31/51 – consider adding pressure gauge to verify keep NSR fill is operating correctly.

Response: A pressure gauge is not required to verify that the NSR UHS Makeup Keep Fill-Line is working correctly. The UHS Makeup Keep Fill-Line is operational during normal plant operation. During this time the Normal Makeup Water System lines are at the higher pressure than the standby UHS (Emergency) Makeup Water lines for the operating and non-operating trains. However, level instrumentation with alarm is provided in the UHS (Emergency) Makeup Water System near the U.S. EPR Emergency Makeup Water Isolation valve, to indicate a postulated unfilled condition of the system.

Page 33/51 – consider adding the ESW keep fill to the FSAR figure.

Response: ESW Keep-Fill line (Tower Keep Fill-Line) is shown on FSAR Figure 9.2-10, ESWS Emergency Makeup Water System Piping and Instrumentation Diagram.

Comment: Page 51/51 – note 5, “to filling of the UHS tower with saline” vs. “to bypass of the UHS tower with saline” Consider correcting to bypass saline.

Response: COLA Part 10 ITAAC Figure 2.4-3 – ESWS Emergency Makeup Water System Functional Arrangement, Note 5 has been updated to read “THE UHS MAKEUP WATER SYSTEM TEST BYPASS LINE PROVIDES CAPABILITY TO BYPASS THE UHS TOWER WITH SALINE WATER DURING MAKEUP WATER SYSTEM TESTING.”

Revised Responses to Items 1, 3, 4, and 5.

1. The UHS Makeup Water System 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 (ESW) building. The ESW building is designed to withstand the effects of natural phenomena, such as earthquakes, tornadoes, hurricanes, floods, and external missiles (GDC-2). The Keep-Fill Line and Post-DBA UHS Makeup Keep-Fill Line safety-related manual isolation valves and check valves are designed to withstand the effects of natural phenomena, such as earthquakes, tornadoes, hurricanes, floods, and external missiles (GDC-2).

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 during normal operation and post DBA when the UHS Makeup Water System is in standby. The UHS Makeup Keep- Fill Line delivers desalinated makeup water from 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 and replenish the UHS makeup water system losses due to valve seat leakage during plant normal operation. Material of piping, fittings, and valves in this line is super austenitic stainless steel. During the UHS Makeup Water System testing and accident conditions, safety-related check valves are provided in the UHS Makeup Keep-Fill line and Post-DBA UHS Makeup Keep-Fill line, to prevent the brackish water from getting into the Normal Makeup Water System and Essential Service Water System lines, respectively. Therefore, manual action is not required for proper system operation and to prevent backflow from the UHS Makeup Water System to the Normal Makeup Water system and Essential Service Water System.

The UHS Makeup Keep-Fill line and Post-DBA UHS Makeup Keep-Fill line are operational during normal plant operation and accident conditions. During normal plant operation, the Normal Makeup Water System and ESWS are at a higher pressure than the UHS (Emergency) Makeup Water System of the operating and non-operating trains. Therefore, the UHS Makeup Water System piping is continuously maintained full of water. To indicate a postulated unfilled condition of the UHS Makeup Water System line, level instrumentation with alarm is provided for each train of the UHS (Emergency) Makeup Water System. CCNPP Unit 3 FSAR Chapter 9, Table 9.2-2 – UHS Makeup Water System Alarm Summary, is updated to include the UHS Makeup Water System full level alarms.

The Post-DBA UHS Makeup Keep-Fill line delivers water from safety-related ESW System return line through 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 postulated valve seat 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 Slowdown) 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 660 gpm (2,498 lpm) of desalinated water to replenish ESWS basin inventory losses due to evaporation, blowdown, drift, seepage, and ESW System valve leakage. The normal makeup water system 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 water pump capacity has approximately 130 gpm margin, flow through the UHS Makeup Keep-Fill line, due to UHS Makeup Water System boundary valve leakage, is inconsequential. The safety-related ESWS 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 ESWS pump room ventilation Air Handling unit (AHU). Since the ESWS pump capacity has approximately 140 gpm margin, flow through the Post-DBA UHS Makeup Keep-Fill line, to maintain UHS Makeup Water System full due to valve seat leakage, is inconsequential. During a DBA, water which passes through the post-DBA UHS Makeup Keep-Fill line is returned to the UHS cooling tower basin through the open ESWS emergency makeup water isolation valve.

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

Additionally, post-DBA scenario, UHS Makeup Water pumps provide a maximum of 750 gpm of brackish makeup water from 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 margin as described above, 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 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 of 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 RAI 330 Q09.02.05-20 response.

The change of the UHS Makeup Water System from dry layup system to 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.

3. Inspection and testing of the UHS Makeup Water pumps are 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, pump functional test will be performed quarterly to verify pump's 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 Building. Low point drain connections are provided to empty trapped water in any dead legs in the system. 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 during normal operation and Post-DBA when the UHS Makeup Water System is in standby. 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 $\frac{1}{4}$ 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 72 hours Post-DBA. Upon the receipt of Safety Injection Signal (SIS), the normal makeup water system motor operated isolation valves and all ESW system blowdown valves will be automatically closed, the UHS Makeup Water isolation valves that may be opened will be automatically closed, and the ESWS emergency makeup water system motor operated isolation valves will be automatically opened. There are no interlocks or permissives for starting the UHS Makeup Water System pumps. Operator action is required to start the UHS Makeup Water pumps manually from the main control room (MCR), within 72 hours after the receipt of a safety injection signal, to maintain the UHS Cooling Tower basin water level.

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.

COLA Impact

The CCNPP Unit 3 COLA Part 2, FSAR, has been revised as follows. Changes to the CCNPP Unit 3 COLA Revision 9 are included in the relevant text of the sections.

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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 ~~660 627~~ gpm (~~2,498 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 (≥ 300 gpm ($\geq 1,135.6$ lpm) 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.

...

9.2.1 Essential Service Water System

No departures or supplements.

9.2.1.1 Design Bases

The ESW 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.

9.2.1.2 System Description

{This section of the U.S. EPR is incorporated by reference with the following supplements.

The ESWS interfaces the UHS Makeup Water System through the Post-DBA UHS Makeup Keep-Fill Line. The Post-DBA UHS Makeup Water Keep-Fill line provides makeup water to the UHS Makeup Water System through a safety-related manual isolation valve, safety-related check valve, and a safety-related flow restriction orifice. No departures or supplements.}

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9.2.5.2.3 {UHS Makeup Water System

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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 valve seat 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 valve seat 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.

During post-DBA operation, the UHS Makeup Water System becomes operational and the UHS Makeup Water System is pressurized by the makeup water pump. The safety-related check valve installed in the Post-DBA UHS Makeup Keep-Fill line prevents UHS (emergency) makeup water from flowing into the ESWS. Depending on the differential pressure between the two systems, during post-DBA operation, the safety-related check valve may or may not allow ESWS water to flow to the UHS Makeup Water System. There is no loss of water from the ESWS during this operation, as the ESWS water returns to the cooling tower basin.

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FSAR Section 9.2.5.3.2 has been updated as shown in green text below. This revision to FSAR Section 9.2.5.3.2 was included in the Supplemental Response to RAI 325, Question 07.05-1².

9.2.5.3.2 Piping, Valves, and Fittings

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UHS Makeup Water System Isolation Valves

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

The UHS Makeup Water pump discharge isolation valves, 30PED10/20/30/40 AA001, are normally closed. Upon the receipt of SI signal, the ESWS normal blowdown valves (30PEB 10/20/30/40 AA016) and emergency blowdown motor operated valves (30PEB 10/20/30/40 AA003) are automatically closed, the ESWS emergency makeup water motor operated isolation valves (30PEB 10/20/30/40 AA0021) are automatically opened, and the ESWS normal makeup water motor operated isolation valves (30PEB 10/20/30/40 AA019) are automatically closed. Operator action is required to start the UHS Makeup Water pumps manually against the closed motor operated UHS Makeup Water pumps discharge isolation valves from the main control room within 72 hours after the receipt of a safety injection signal to maintain the UHS Cooling Tower basin water level. Upon the receipt of SI signal coincident with Low-Low UHS cooling tower basin water level signal, the UHS makeup water pumps are started manually against closed motor operated UHS Makeup Water pumps discharge isolation valves (30PEB 10/20/30/40 AA013) and UHS Makeup Water pump minimum flow valves (30PEB 10/20/30/40 AA002). The pump minimum flow valves are automatically opened to establish the pump minimum flow requirement. Once minimum flow is achieved, the pumps discharge isolation valves will be automatically opened to fill the UHS cooling tower basin with Chesapeake Bay water and maintain the basin water level within the established operating limits. The UHS Makeup Water pump discharge isolation valves are automatically closed on a pump stop signal.

²UniStar Nuclear Energy Letter UN#13-060, 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 325, Information Systems Important to Safety, dated April 30, 2013.

The UHS Makeup Water pump minimum flow valves, 30PED10/20/30/40 AA002, are normally closed during normal operations. Following an SI signal ~~coincident with a Low-Low UHS cooling tower basin water level signal~~ and manual operation to start the UHS Makeup water pump, the pump minimum flow recirculation valves are automatically opened and modulate to maintain the pump minimum flow requirement. Once the pump's minimum flow requirement is achieved, UHS Makeup Water pump discharge valves (30PEB 10/20/30/40 AA001) start opening and minimum flow recirculation valves start closing to provide makeup water to the UHS tower basin. Once the UHS cooling tower basin is filled to its operating level, the ESW Emergency makeup water isolation valve (30PEB 10/20/30/40 AA021) is automatically closed and the UHS Makeup Water pump minimum flow valve (30PEB 10/20/30/40 AA002) starts reopening to maintain the pump minimum flow requirement.

...

9.2.5.5 Safety Evaluation

...

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 automatically 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 automatically fully opened and the recirculation valves are automatically closed. Once the UHS Makeup Water pumps are started manually, subsequent operations are accomplished automatically to provide flow to the UHS cooling tower basins. The traveling screen wash isolation valves are automatically opened as required to provide high pressure spray water to the traveling screens.

The UHS Makeup Water System will incorporate additional design provisions that minimize the effect of hydraulic transients upon the functional capability and the integrity of the system components. These design features include slow stroke motor-operated isolation valves, automatic air release valves, UHS Makeup Keep-Fill Line function that operates with the Normal Makeup Water pumps running and Post-DBA UHS Makeup Keep-Fill Line function that operates with the ESWS pumps running 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.

...

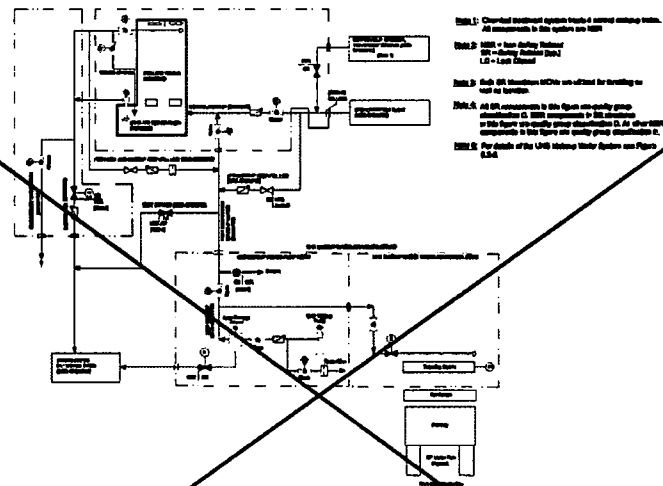
FSAR Table 9.2-2 has been updated as shown in green text below. This revision to FSAR Table 9.2-2 was included in the Supplemental Response to RAI 336, Question 09.02.05-23³.

Table 9.2-2— {UHS Makeup Water System Alarm Summary}

MCR/RSS Display	Division	Setpoint Name	Function
...
UHS Makeup Water traveling screen abnormal (bearing temperature Hi)	1/2/3/4	Max 2	Max 2: Alarm and Traveling Screen Trip
		Max 1	Max 1: Alarm
UHS Makeup Water System Heat Tracing Failure	1/2/3/4	Max 1	Max 1: Alarm (Alerts operator of equipment failure)
UHS Makeup Water Pump Forebay Level	1/2/3/4	Min 1	Min 1: Alarm (Alerts operator of low water level in UHS Makeup Water Forebay)
		Min 2	Min 2: Alarm (Alerts operator that UHS Makeup Water Forebay is at or above Technical Specification Low Water Level)
<u>UHS Makeup Water System Full Level</u>	<u>1/2/3/4</u>	<u>Min 1</u>	<u>Min 1: Status display in MCR</u>
		<u>Min 2</u>	<u>Min 2: Alarm (Operator to determine the source of leakage in the UHS Makeup Water System and take corrective action)</u>

³UniStar Nuclear Energy Letter UN#13-059, 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 336, Ultimate Heat Sink, dated April 30, 2013.

Figure 9.2-3— (Normal Makeup, Emergency Makeup, Blowdown & Chemical Treatment)



-Typical for each of 4 independent trains
-Valve positions reflect post 72 hour DBA operations

CCNPP Unit 3

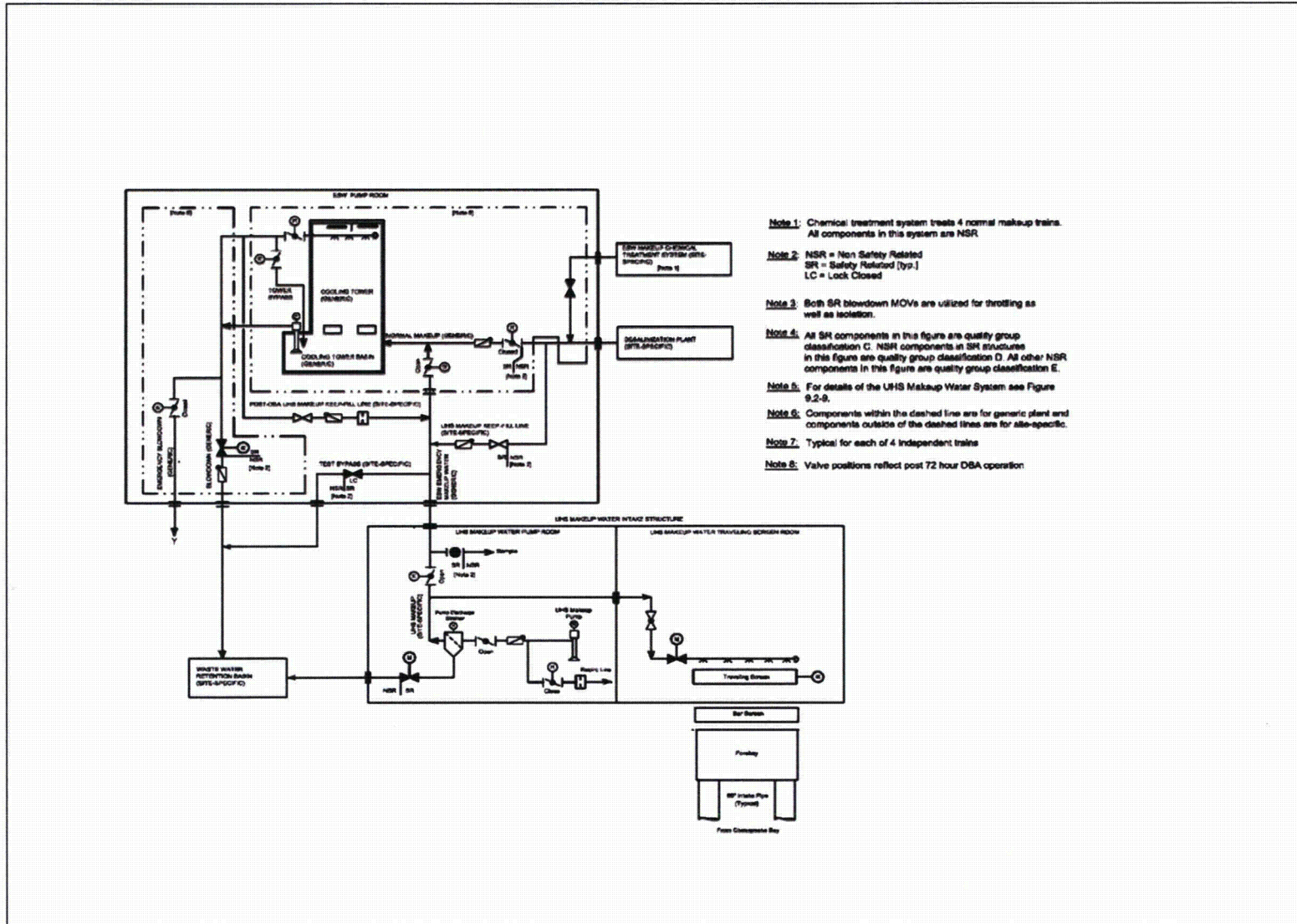
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FSAR: Chapter 9.0

Water Systems

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



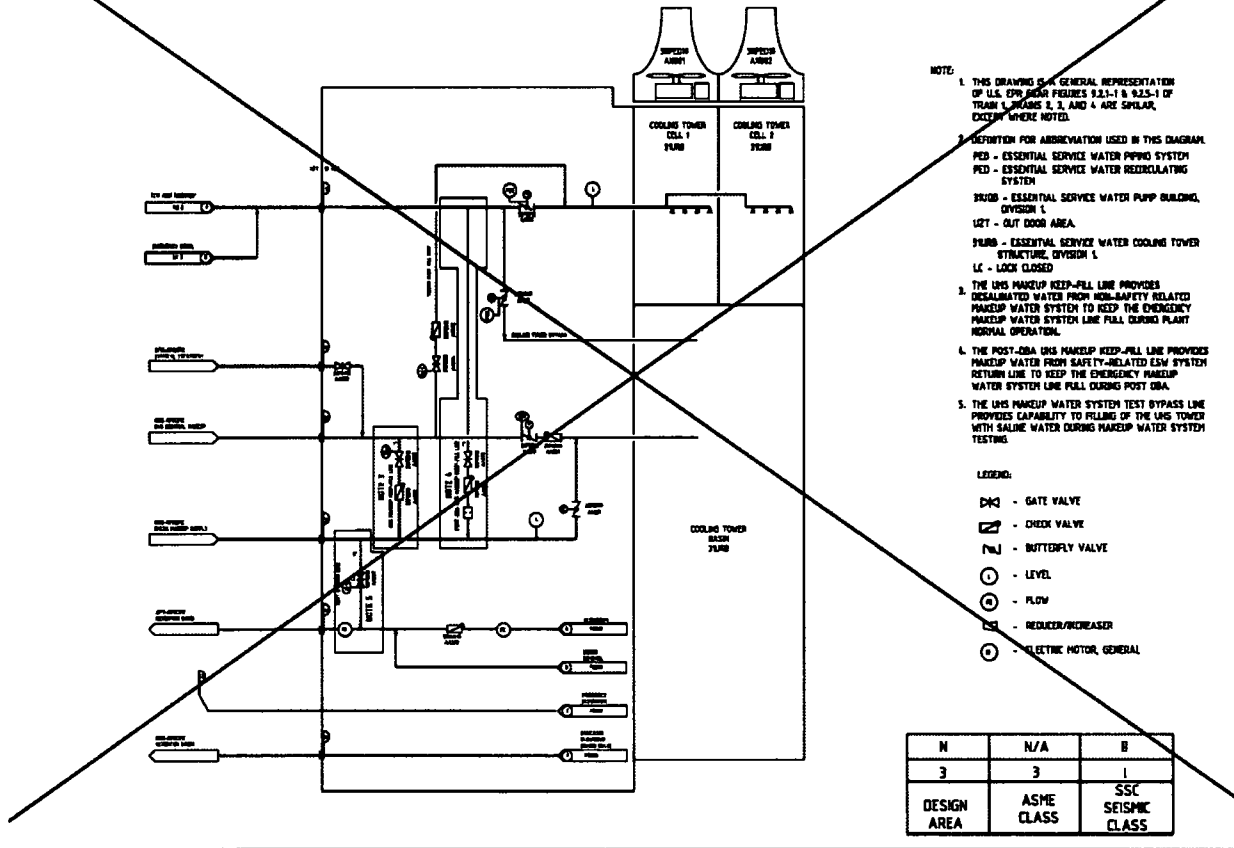
CCNPP Unit 3

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Rev 9

Figure 2.4-3— (ESWS Emergency Makeup Water System Functional Arrangement)



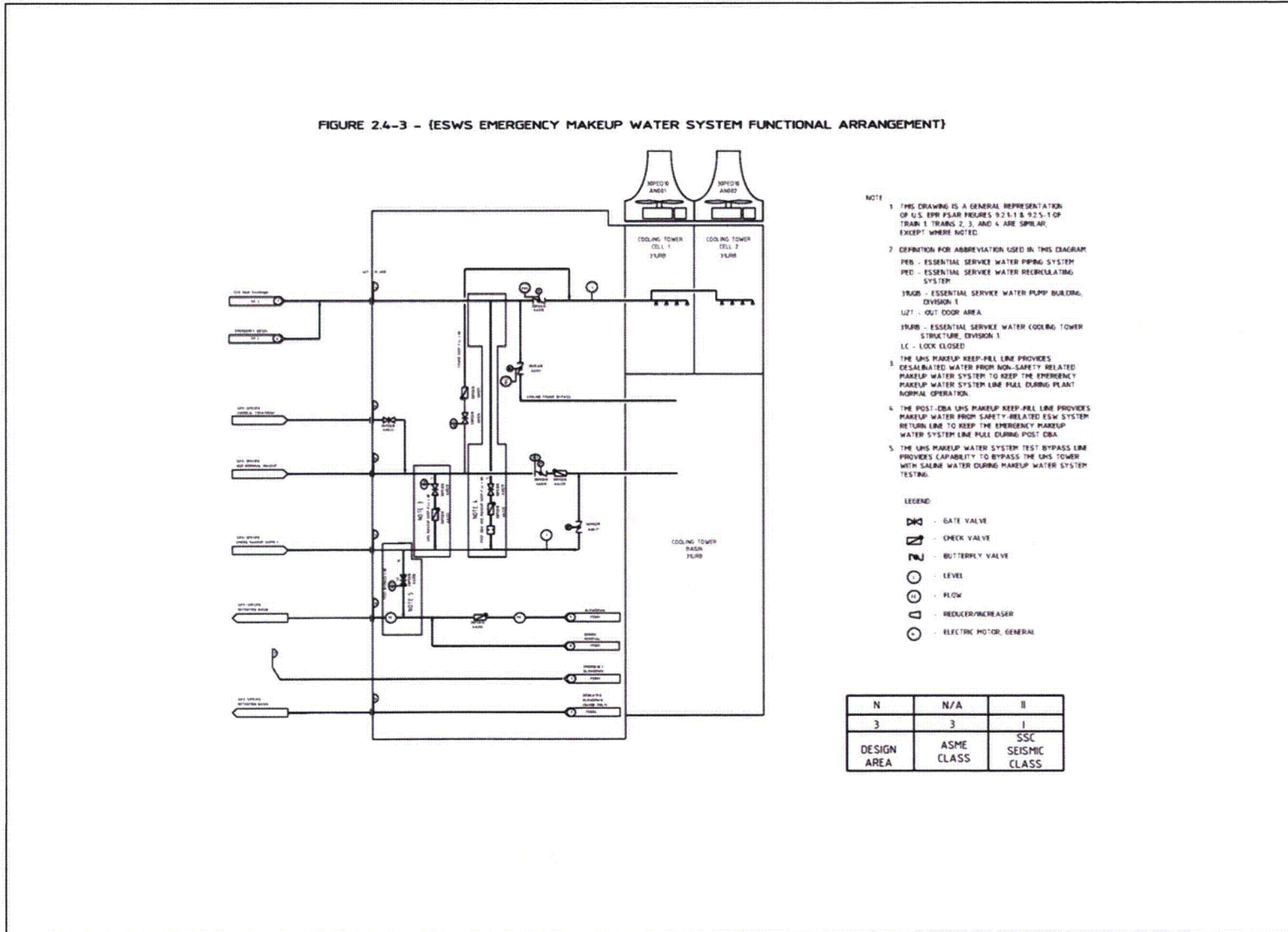
- NOTE:
1. THIS DRAWING IS A GENERAL REPRESENTATION OF U.S. EPA RCRA FIGURES 9.2.1-1 & 9.2.3-1 OF TANK 6. PHASES 1, 2, AND 4 ARE SIMILAR, EXCEPT WHERE NOTED.
 2. DEFINITION FOR ABBREVIATION USED IN THIS DIAGRAM:
 PED - ESSENTIAL SERVICE WATER PIPING SYSTEM
 RED - ESSENTIAL SERVICE WATER REDUCING SYSTEM
 ESWS - ESSENTIAL SERVICE WATER PUMP BUILDING, DIVISION 1
 ODA - OUT DOOR AREA
 ESWS - ESSENTIAL SERVICE WATER COOLING TOWER STRUCTURE, DIVISION 1
 LC - LOCK CLOSED
 3. THE ESWS 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-ODA ESWS MAKEUP KEEP-FILL LINE PROVIDES MAKEUP WATER FROM SAFETY-RELATED ESWS SYSTEM RETURN LINE TO KEEP THE EMERGENCY MAKEUP WATER SYSTEM LINE FULL DURING POST ODA.
 5. THE ESWS MAKEUP WATER SYSTEM TEST BYPASS LINE PROVIDES CAPABILITY TO FILLING OF THE ESWS TOWER WITH SALINE WATER DURING MAKEUP WATER SYSTEM TESTING.

- LEGEND:
- GV - GATE VALVE
 - CV - CHECK VALVE
 - BV - BUTTERFLY VALVE
 - ⊖ - LEVEL
 - ⊕ - FLOW
 - RI - REDUCER/INCREASER
 - EM - ELECTRIC MOTOR, GENERAL

N	N/A	B
3	3	1
DESIGN AREA	ASME CLASS	SSC SEISMIC CLASS

Part 10-ITAC

Figure 2.4-3— {ESWS Emergency Makeup Water System Functional Arrangement}



Enclosure 2

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

**Table of Changes to CCNPP Unit 3 COLA
 Associated with the Supplemental Response to RAI No. 332**

Change ID #	Subsection	Type of Change	Description of Change
Part 2 – FSAR			
CC3-12-0242	2.4.11.6	Incorporate COLA markups associated with the response to RAI 332, Q09.02.05-22.	The response to RAI 332, Q09.02.05-22 ¹ modifies and adds information associated with UHS piping.
CC3-11-0221	Table 3.10-1	Incorporate COLA markups associated with the response to RAI 253, Question 03.07.02-45.	Seismic Category “II-SSE” was removed from Table 3.10-1 as part of the response to RAI 253, Question 03.07.02-45 ⁴ .
CC3-11-0103	9.2.5.2.3	Incorporate COLA markups associated with the response to RAI 288, Question 02.04.11-1.	The response to RAI 288, Question 02.04.11-1 ⁵ included a change to the first paragraph in FSAR Section 9.2.5.2.3. Text was added involving the predicted minimum low water level in the Chesapeake Bay.
CC3-12-0242	9.2.5.2.3	Incorporate COLA markups associated with the response to RAI 332, Q09.02.05-22.	The response to RAI 332, Q09.02.05-22 ¹ modifies and adds information associated with UHS piping.
CC3-12-0241	9.2.5.2.3	Incorporate COLA markups associated with the response to RAI 330, Question 09.02.05-20.	The response to RAI 330, Question 09.02.05-20 ⁶ involves updating the UHS Makeup Water traveling screen classification to Safety-Related and Seismic Category I in the applicable CCNPP Unit 3 Part 2, FSAR sections and Part 10, ITAAC Tables.

⁴UniStar Nuclear Energy Letter UN#12-055, 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 253, Seismic System Analyses, dated June 21, 2012.

⁵UniStar Nuclear Energy Letter UN#11-149, 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 288, Low Water Considerations, dated May 4, 2011.

⁶ UniStar Nuclear Energy Letter UN#12-153, 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 330, Ultimate Heat Sink, dated December 20, 2012

Change ID #	Subsection	Type of Change	Description of Change
CC3-12-0223	9.2.5.2.3	Incorporate COLA markups associated with the response to RAI 348, Questions 09.02.05-28 and 09.02.05-29.	FSAR Section 9.2.5.2.3, "UHS Makeup Water System" is updated to include a description of the Unit 3 intake area as part of the RAI 348, Question 09.02.05-29 ⁷ response. The words "surveillance test bypass" have been changed to read "surveillance test bypass line" in the third paragraph of FSAR Section 9.2.5.2.3 as part of the RAI 348, Question 09.02.05-28 response.
CC3-12-0142	9.2.5.3.2	Incorporate COLA markups associated with the response to RAI 340, Questions 03.09.06-3, 03.09.06-4, 03.09.06-5.	The response to RAI 340, Question 03.09.06-3 ⁸ added text regarding traveling screen sizing under the heading, "UHS Makeup Water Intake Structure Bar Screens and Traveling Screens."
CC3-11-0173	9.2.5.3.2	Incorporate COLA markups associated with the response to RAI 279, Question 09.02.05-9.	The response to RAI 279, Question 09.02.05-9 ⁹ added the second paragraph under the heading, "UHS Makeup Water System Pumps."

⁷UniStar Nuclear Energy Letter UN#12-147, 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 348, Ultimate Heat Sink, dated December 11, 2012.

⁸UniStar 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

⁹UniStar Nuclear Energy Letter UN#11-260, 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 September 29, 2011.

Change ID #	Subsection	Type of Change	Description of Change
CC3-12-0223	9.2.5.3.2	Incorporate COLA markups associated with the response to RAI 348, Questions 09.02.05-28 and 09.02.05-29.	The first paragraph under the heading, "UHS Makeup Water System Isolation Valves" of FSAR Subsection 9.2.5.3.2, has been revised to reflect the test bypass isolation valve as a manual valve as part of the RAI 348, Question 09.02.05-28 ⁷ response.
CC3-11-0116	9.2.5.3.2	Incorporate COLA markups associated with the response to RAI 279, Questions 09.02.05-5, 09.02.05-8, and 09.02.05-14.	The response to RAI 279, Question 09.02.05-5 ¹⁰ added text regarding DBA mitigation under the heading, "Screen Wash System Components."
CC3-12-0233	9.2.5.3.2	Incorporate COLA markups associated with the response to RAI 333, Question 03.08.04-29.	Revised text discussing UHS piping design is provided as part of the RAI 333, Question 03.08.04-29 ¹¹ response.
CC3-12-0242	9.2.5.3.2	Incorporate COLA markups associated with the response to RAI 332, Q09.02.05-22.	The response to RAI 332, Q09.02.05-22 ¹ modifies and adds information associated with UHS piping.
CC3-12-0241	9.2.5.3.2	Incorporate COLA markups associated with the response to RAI 330, Question 09.02.05-20.	The response to RAI 330, Question 09.02.05-20 ⁶ involves updating the UHS Makeup Water traveling screen classification to Safety-Related and Seismic Category I in the applicable CCNPP Unit 3 Part 2, FSAR sections and Part 10, ITAAC Tables.
CC3-13-0083	9.2.5.3.2	Incorporate COLA markups associated with the response to RAI 325, Question 07.05-1.	The response to RAI 325, Question 07.05-1 added specific valve references and clarified which valves operate automatically.

¹⁰UniStar Nuclear Energy Letter UN#11-260, 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.

¹¹UniStar Nuclear Energy Letter UN#12-155, 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 333, Other Seismic Category I Structures, dated December 20, 2012.

Change ID #	Subsection	Type of Change	Description of Change
CC3-13-0084	9.2.5.3.2	Incorporate COLA markups associated with the Supplemental RAI 330, Question 09.02.05-20 response.	FSAR Section 9.2.5.3.2 has been updated to reflect that the traveling screen wash isolation valve automatically opens on a differential water level across the screens or on a timer basis, once the UHS Makeup pump has established the minimum required pump flow. Also, Section 9.2.5.3.2 has been updated to include that the traveling screen wash isolation valve automatically closes once the differential water level across the screens is at normal operating level or when the timer sequence is completed. These changes were made as part of the Supplemental RAI 330, Question 09.02.05-20 response ¹² .
CC3-13-0085	9.2.5.3.2	Incorporate COLA markups associated with the Supplemental RAI 332, Question 09.02.05-22 response (this response).	FSAR Section 9.2.5.3.2 has been updated to clarify manual operation of the UHS Makeup Water Pumps as part of the Supplemental RAI 330, Question 09.02.05-22 response (this response).
CC3-10-0302	9.2.5.5	Incorporate COLA markups associated with the response to RAI 253, Questions 03.07.02-42, 43, 44, 47, 48, 52, and 53.	Text is added in the bullet which discusses the UHS Makeup Water System pump as part of the response to RAI 253, Questions 03.07.02-42, 43, 44, 47, 48, 52, and 53 ¹³ .

¹²UniStar Nuclear Energy Letter UN#13-064, 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 330, Ultimate Heat Sink, dated May 14, 2013.

¹³UniStar Nuclear Energy Letter UN#10-285, 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 253, Seismic System Analyses, dated November 16, 2010.

Change ID #	Subsection	Type of Change	Description of Change
CC3-12-0223	9.2.5.5	Incorporate COLA markups associated with the response to RAI 348, Questions 09.02.05-28 and 09.02.05-29.	The first bullet in FSAR Subsection 9.2.5.5, "Safety Evaluation" has been changed to add mention of GDC 5 as part of the RAI 348, Question 09.02.05-29 ⁷ response.
CC3-11-0137	Table 9.2-2	Incorporate COLA markups associated with the response to RAI 279, Question 09.02.05-7.	Table 9.2-2 was added in the response to RAI 279, Question 09.02.05-7 ¹⁴
CC3-13-0081	Table 9.2-2	Incorporate COLA markups associated with the supplemental response to RAI 336 Question 09.02.05-23.	The supplemental response to RAI 336 ³ Question 09.02.05-23 adds information concerning UHS Makeup Water System.
CC3-13-0085	2.4.11.6, Table 3.10-1, 9.2.1.2, 9.2.5.3.2, 9.2.5.3.2, , 9.2.5.5, Table 9.2-2, Figure 9.2-3	Incorporate COLA markups associated with the supplemental response to RAI 332, Q09.02.05-22 (this response).	The supplemental response to RAI 332, Q09.02.05-22 provides clarification and corrects values associated with the UHS Makeup Keep-Fill Line in response to NRC feedback on the initial response to RAI 332, Q09.02.05-22 (this response).
Part 10 – Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) and ITAAC Closure			
CC3-12-0242	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 ¹ 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.
CC3-13-0085	Appendix B, ITAAC Figure 2.4-3	Incorporate COLA markups associated with the supplemental response to RAI 332, Q09.02.05-22 (this response).	The supplemental response to RAI 332, Q09.02.05-22 replaces ITAAC Figure 2.4-3 (this response).

¹⁴UniStar 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