Greg Gibson
Senior Vice President, Regulatory Affairs

750 East Pratt Street, Suite 1600
Baltimore, Maryland 21202

UniStar
NUCLEAR ENERGY

10 CFR 50.4
10 CFR 52.79

April 1, 2011

UN#11-123

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 277, Essential Service Water System

References:
1) Surinder Arora (NRC) to Robert Poche (UniStar Nuclear Energy), "FINAL RAI 277 SBPA 5301" email dated January 21, 2011

2) UniStar Nuclear Energy Letter UN#11-077, from Greg Gibson to Document Control Desk, U.S. NRC, Submittal of Response to RAI 277, Essential Service Water System, dated February 7, 2011

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 21, 2011 (Reference 1). This RAI addresses the Essential Service Water System, as discussed in Section 9.2.1 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 7.

Reference 2 provided an April 6, 2011 schedule for the responses to Questions 09.02.01-1 and 09.02.01-2. Enclosure 2 provides our responses to RAI 277, Questions 09.02.01-1 and 09.02.01-2, and includes revised COLA content. A Licensing Basis Document Change Request has been initiated to incorporate these changes into a future revision of the COLA.

D096
NRO

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) 470-4205, or Mr. Wayne A. Massie at (410) 470-5503.

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

Executed on April 1, 2011

Greg Gibson

Enclosure: Response to NRC Request for Additional Information RAI 277, Questions 09.02.01-1 and 09.02.01-2, Essential Service Water System, Calvert Cliffs Nuclear Power Plant, Unit 3

cc: Surinder Arora, NRC Project Manager, U.S. EPR Projects Branch
Laura Quinn, NRC Environmental Project Manager, U.S. EPR COL Application
Getachew Tesfaye, NRC Project Manager, U.S. EPR DC Application (w/o enclosure)
Charles Casto, Deputy Regional Administrator, NRC Region II (w/o enclosure)
Silas Kennedy, U.S. NRC Resident Inspector, CCNPP, Units 1 and 2
U.S. NRC Region I Office

GTG/RDS/mdf

Enclosure

Response to NRC Request for Additional Information
RAI 277, Questions 09.02.01-1 and 09.02.01-2, Essential Service Water System
Calvert Cliffs Nuclear Power Plant, Unit 3

RAI 277

Question 09.02.01-1

The U.S. EPR design has defined the value for the UHS emergency makeup. As described in Tier 2 FSAR Table 9.2.5-2; "Ultimate Heat Sink Design Parameters," the "required cooling tower emergency makeup flow, post DBA plus 72 hours through 30 days" is defined as 300 gpm (1136 lpm) per UHS cooling tower. In Section 9.2.1.1 of the CCNPP3 FSAR, Revision 7, the COL applicant states that the "maximum evaporative loss from a UHS cooling tower during the post 72 hours DBA is 225 gpm (852 lpm)". Provide clarification in the CCNPP3 FSAR between the EPR required cooling tower emergency makeup flow rate and the maximum evaporative losses at the CCNPP site and justify the pump capacity utilized to meet this emergency makeup flow rate.

Response

The design CCNPP Unit 3 UHS Makeup Pump capacity exceeds the required makeup flow rate of 300 gpm for the post DBA (which includes losses from evaporation, drift and seepage) identified in U.S. EPR FSAR, Tier 2, Table 9.2.5-2. As specified in CCNPP Unit 3 COLA Revision 7, FSAR Section 9.2.5.3.2, under sub heading "UHS Makeup Water System Pumps," each UHS makeup water pump is designed to deliver a flow of 750 gpm, thus providing for adequate makeup flow to the UHS cooling tower basin. The design of the UHS makeup pump considers the U.S. EPR requirement of 300 gpm for the post DBA, and also includes margins for pump wear, instrument uncertainty, frequency variation, and for conservatism in the preliminary design. COLA FSAR Section 9.2.5.1 will be updated to clarify the emergency makeup flow rate.

COLA Impact

FSAR Section 9.2.5.1 is being updated as follows:

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:

{ESWS support systems are schematically represented in Figure 9.2-3. Normal essential service water makeup provides up to 629 gpm (2,381 lpm) of desalinated water to replenish ESWS inventory losses due to evaporation, blowdown, drift, and incidental system leakage 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)~~, and blowdown is secured~~.

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.

Question 09.02.01-2

As a follow up to RAI 164 Q8.3.1-12 and the review of the cathodic protection system, the staff determined that the CCNPP Unit 3 COL applicant did not adequately describe this system. Since the applicant has taken credit for cathodic protection to provide system longevity and ESWS corrosion protection (Section 9.2.1), this cathodic protection system should be adequately described in the FSAR.

Response

COLA FSAR Subsection 8.3.1.1 will be revised by adding a description of the Cathodic Protection (CP) System for corrosion protection of underground pipes (including ESWS pipes) in CCNPP Unit 3.

COLA Impact

FSAR Section 8.3.1.1.15 is being added as follows:

{Section 8.3.1.1.15 is added as a supplement to the U. S. EPR FSAR.

8.3.1.1.15 Cathodic Protection System

The Cathodic Protection (CP) system for the underground metallic pipe is designed, installed, and maintained in accordance with NACE Standard SP0169-2007 (NACE, 2007).

Underground metallic pipes are coated, or coated and wrapped, in accordance with Section 5 of NACE Standard SP0169-2007 (NACE, 2007). The need for cathodic protection for particular piping is determined based on the piping material, soil resistivity, and ground water chemistry data. Cathodic protection is achieved by providing impressed current from a rectifier power supply source through anodes. These anodes are installed in an interconnected distributed shallow ground bed configuration or in a linear anode configuration, depending on local conditions. Where linear anodes are used, the anodes are installed parallel and in close proximity to the piping being protected. Due to the extensive network of underground piping, an interconnected system is provided with rectifiers sized to include the ground grid, which is connected to the cathodically protected buried pipes. Therefore, any incidental contact between pipe and grounded structures will not adversely affect CP system performance.

A localized sacrificial or galvanic anode CP system shall be used for the buried metallic pipes that are not connected to the station grounding grid or that are located in outlying areas.

Test stations for voltage, current or resistance measurements are provided in accordance with Section 4.5.0 of NACE Standard SP0169-2007 (NACE, 2007) to facilitate CP testing.}

FSAR Section 8.3.3 is being updated as follows:

8.3.3 References 003066

{**NACE, 2007.** NACE International Standard Practice SP0169-2007, Control of External Corrosion on Underground or Submerged Metallic Piping Systems, March 2007.

NRC, 1988. Station Blackout, Regulatory Guide 1.155, U.S. Nuclear Regulatory Commission, August 1988.}

FSAR Section 9.2.1.3.5 is being updated as follows:

9.2.1.3.5 Piping, Valves, and Fittings

The U.S. EPR includes the following COL item in Section 9.2.1.3.5:

> A COL applicant that references the U.S. EPR design certification will provide a description of materials that will be used for the essential service water system (ESWS) at their site location, including the basis for determining that the materials being used are appropriate for the site location and for the fluid properties that apply.

This COL item is addressed as follows:

{The ESWS piping, valves and fittings are made of carbon steel. This is compatible with the water chemistry in the UHS tower basin. Buried piping is coated and wrapped and provided with appropriate cathodic protection. The Cathodic Protection (CP) system for underground pipe is described in Section 8.3.1.1.15. The UHS cooling towers are constructed of reinforced concrete, tower fill is constructed of ceramic tile, spray piping and nozzles are fabricated of corrosion resistant materials (e.g., stainless steel, bronze), and the cooling tower basin is made of concrete. Appropriate chemical treatment as described in Section 9.2.5.2.4, is used to maintain the quality of water in the basin at an acceptable level to reduce corrosion, scaling etc, of ESWS components during normal operation.

. . .