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UniStar
NUCLEAR ENERGY

10 CFR 50.4
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May 3, 2011

UN#11-127

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 a May 4, 2011 schedule for the response to Question 09.02.01-3. The enclosure provides our response to RAI 277, Question 09.02.01-3, 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.

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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 May 3, 2011

for Greg Gibson

Enclosure: Response to NRC Request for Additional Information RAI 277, Question 09.02.01-3, 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

Enclosure

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

RAI 277

Question 09.02.01-3

Post DBA, the applicant stated that no chemical treatment in the ESWS basin is required and the corrosive effects of Chesapeake Bay water on the ESWS piping and components have been evaluated and determined to have a negligible effect on the ability of the ESWS to perform its safety function for short term operation post-DBA. The applicant should describe in the CCNPP Unit 3 FSAR and provide an explanation to support this statement that chemical treatment is not necessary from 72 hours post DBA out through 30 days.

Response

COLA FSAR Section 9.2.1.3.5 will be revised to provide a justification that no chemical treatment is required in the Essential Service Water System from 72 hours post-design basis accident through 30 days.

COLA Impact

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 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.

~~Post-DBA, there is no chemical treatment in the basin. However, the corrosive effects of Chesapeake Bay water on the ESWS piping and components have been evaluated and determined to have a negligible effect on the ability of the ESWS to perform its safety function for short term operation post-DBA.~~

Under normal operation, the ESWS is exposed to desalinated water treated with corrosion inhibitors. During post DBA scenario, the ESWS may be exposed to brackish water if the non-safety-related source of desalinated water is unavailable from 72 hours to 30 days after the DBA.

Above ground ESWS piping, valves and fittings are made of bare carbon steel (internally) having 0.250 inches corrosion allowance.

During normal operating conditions, plain carbon steel used for above ground piping (i.e., uncoated) exposed to the desalinated ESWS water quality with corrosion inhibitors, during normal operating conditions, is expected to have a uniform corrosion rate of approximately 0.004 inches/year or less. Over a period of 60 years this will result in a loss of approximately 0.24 inches of wall thickness or less. During the 30-day DBA scenario, assuming a maximum uniform corrosion rate of approximately 0.025 inches/year, the expected loss of wall thickness is approximately 0.002 inches. Therefore, the total loss of wall thickness due to internal corrosion of plain carbon steel is approximately 0.242 inches or less. The selection of carbon steel wall thickness includes additional allowance for corrosion.

For buried portions of the ESWS piping and fittings, carbon steel with appropriate internal lining (e.g. 2-layer fusion-bonded epoxy, Type II cement), per the recommendation of ANSI/AWWA C213/ASTM C150, is used with a qualified installation program. Appropriate external coating (e.g. epoxy) is also used to protect from external corrosion. Additionally, exterior surfaces of the buried piping exposed to the soil are cathodically protected.

The buried piping with appropriate internal lining (e.g. 2-layer fusion-bonded epoxy, Type II cement) that is exposed to normal operating condition desalinated ESWS water quality, with corrosion inhibitors in the buried piping is not expected to have any detrimental corrosive effects on the ESWS over the 60 year design life. Appropriate internal lining (e.g. 2-layer fusion-bonded epoxy, Type II cement) exposed to the Chesapeake Bay water quality during the 30-day DBA scenario is not expected to have any detrimental effects, even without the chemical treatment.