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UniStar
NUCLEAR ENERGY

10 CFR 50.4
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November 28, 2012

UN#12-133

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 367, Structural and Systems Engineering – Inspections, Tests, Analyses, and Acceptance Criteria

References:
1) Surinder Arora (NRC) to Paul Infanger (UniStar Nuclear Energy), "CCNPP3 - Final RAI 367 SEB 6555," dated September 13, 2012

2) UniStar Nuclear Energy Letter UN#12-098, 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 367, Structural and Systems Engineering – Inspections, Tests, Analyses, and Acceptance Criteria, dated October 5, 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 September 13, 2012 (Reference 1). This RAI addresses the Structural and Systems Engineering – Inspections, Tests, Analyses, and Acceptance Criteria, as discussed in Section 14.3.2 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 8.

Reference 2 indicated that a response to RAI 367 would be provided to the NRC by November 30, 2012.

Enclosure 1 provides our response to RAI No. 367, Question 14.03.02-20, 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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Enclosure 2 provides a table of changes to the CCNPP Unit 3 COLA associated with this RAI 367 response.

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 November 28, 2012

FOR

Mark T. Finley

Enclosures:

1) Response to NRC Request for Additional Information RAI No. 367, Question 14.03.02-20, Structural and Systems Engineering – Inspections, Tests, Analyses, and Acceptance Criteria, Calvert Cliffs Nuclear Power Plant, Unit 3

2) Table of Changes to CCNPP Unit 3 COLA Associated with Response to RAI No. 367

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 No. 367, Question 14.03.02-20, Structural and Systems Engineering
Inspections, Tests, Analyses, and Acceptance Criteria,
Calvert Cliffs Nuclear Power Plant, Unit 3

RAI No. 367

Question 14.03.02-20

In RAI 334, Question 14.03.02-19, the staff requested that the applicant, (1) for all Seismic Category (SC) II structures, include in the FSAR the design information provided in RAI responses to RAI 275, Question 14.03.02-13 and RAI 315, Question 03.07.02-63, (2) clarify the inconsistency between the proposed mark-up for FSAR Subsection 3.7.2.8 and the ITAACs related to SC II structures.

The staff reviewed the RAI response to Question 14.03.02-19 provided in UniStar letter UN#12-038 dated April 20, 2012 (ML12115A181).

The staff determined that the following information is needed to resolve this RAI:

1. The FSAR mark-ups do not include the analysis and conceptual design of the SC II structures, which information will be provided in the response to RAI 315, Question 03.07.02-63. The staff understands that the information may not be available at this time, but the applicant should confirm that the FSAR mark-ups with the information will be submitted for the staff's review on or before the response to RAI 315, Question 03.07.02-63, which is currently scheduled to be submitted on June 5, 2013.

2. In the FSAR mark-ups for the Access Building, Section 1 Building Layout/Details, provided in the response to RAI 334, Question 14.03.02-19 and RAI 275, Question 14.03.02-13, the wording "... layout sketches and details are not included as part of the <u>response</u>" needs to be corrected, because the responses to RAI 334, Question 14.03.02-19 and RAI 275, Question 14.03.02-13 committed to provide in the FSAR the conceptual design of the Access Building.

3. Since the Circulating Water System (CWS) Makeup Water Intake Structure (MWIS) is also an SC II structure, the staff requests that, for the CWS MWIS, the applicant provide in the FSAR the design information comparable to that provided for other SC II structures as shown in FSAR mark-ups for Subsection 3.7.2.8.

The staff needs the above information to be able to conclude in the SER that there is reasonable assurance that the specific COL interface requirements for the CCNPP Unit 3 Seismic Category II structures have been adequately implemented and addressed in the CCNPP Unit 3 COLA.

Response

RAI 14.03.02-20 Part 1

The analysis and design information for the Seismic Category II structures, consistent with the response to RAI 275, Question 14.03.02-13[1], will be included in the COLA section markups associated with the response to RAI 315, Question 03.07.02-63[2].

RAI 14.03.02-20 Part 2

The conceptual design of the Access Building, consistent with the response to RAI 275, Question 14.03.02-13[1], will be included in the COLA section markups associated with the response to RAI 315, Question 03.07.02-63[2].

The response to RAI 275, Question 14.03.02-13[1], stated that the analysis and design of the Access Building have not been performed, and that the "layout details of the Access Building are in the preliminary stage and will be finalized during the detailed design engineering phase. Therefore, layout sketches and details are not included as part of this response." The conceptual design of the Access Building will be included in the COLA section markups associated with the response to RAI 315, Question 03.07.02-63[2].

The response to RAI 334, Question 14.03.02-19[3], was incorrect in indicating that it included the conceptual design of the Access Building. The correct statement in the response to RAI 334 was, "... layout sketches and details are not included as part of this response." The conceptual design of the Access Building will be included in the COLA section markups associated with the response to RAI 315, Question 03.07.02-63[2].

RAI 14.03.02-20 Part 3

The requested design information for the Circulating Water System (CWS) Makeup Water Intake Structure (MWIS) is being provided in the Final Safety Analysis Report (FSAR), Subsection 3.7.2.8.

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[1] UniStar Nuclear Energy Letter UN#11-246, 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 No. 275, Structural Inspection, Tests, Analysis, and Acceptance Criteria, dated September 1, 2011

[2] UniStar Nuclear Energy Letter UN#12-017, 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, Updated RAI Closure Plan, dated February 21, 2012

[3] UniStar Nuclear Energy Letter UN#12-038, 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 No. 334, Structural and Systems Engineering - Inspections, Tests, Analyses, and Acceptance Criteria, dated April 20, 2012

COLA Impact

The CCNPP Unit 3 COLA Part 2, FSAR, has been revised as follows:

3.7.2.8 Interaction of Non-Seismic Category I Structures with Seismic Category I Structures

...

The Conventional Seismic Grid Systems Control Building is located in the Switchyard area, and has a minimum separation distance of approximately 700 ft (213.4 m) from the nearest Seismic Category I SSCs (see Figure 2.1-5). Therefore, potential collapse of this building has no adverse impact on the function of Seismic Category I SSCs. This meets NUREG-0800 Section 3.7.2, Acceptance Criterion 8.A (NRC, 2007a).

Circulating Water System Makeup Water Intake Structure

1. Building Layout/Details

The Circulating Water System (CWS) Makeup Water Intake Structure (MWIS) is integrally connected to the Forebay and, together with the UHS Makeup Water Intake Structure, share a common Basemat. The CWS MWIS, Forebay and UHS are also referred to as the Common Basemat Intake Structures (CBIS). The CWS MWIS is a site-specific structure and is classified as a Nonsafety-Related Augmented Quality (NS-AQ) Seismic Category II structure according to COLA FSAR Table 3.2-1.

The CWS MWIS sub-structure is comprised of a reinforced concrete basemat, below grade reinforced concrete walls and a reinforced concrete slab at grade. The super-structure for the pump house enclosure and electrical room is a cladded steel structure, braced in both directions.

Key floor levels of the CWS MWIS structure and its structural floor systems include:

- Basemat Level: Reinforced concrete basemat shared by the CWS MWIS, Forebay and UHS MWIS.
- Grade level: Reinforced concrete floor serving as the Operating Deck Level for the CWS.
- Roof level: Structural steel pump house enclosure and electrical room.

The pump house enclosure is primarily founded on a grade slab on the Northern end while a smaller portion at the Southern end is supported by the operating deck of the CWS MWIS.

2. Acceptable Codes and Standards

The CWS MWIS structure is analyzed and designed to the same requirements as the site-specific Seismic Category I structures. The applicable design codes and standards for the reinforced concrete and structural steel components of the CWS MWIS are listed in COLA FSAR Tables 3.2-1 and 3.7-11. The reinforced concrete components of the CWS MWIS are designed in accordance with ACI 349 and the structural steel components of the CWS MWIS designed in accordance with ANSI/AISC N690.

3. Loads and Load Combinations

The design loads and load combinations for the CWS MWIS are consistent with those used for the design of site-specific Seismic Category I structures.

a. Dead Loads

Dead loads for the CWS MWIS are in accordance with COLA FSAR Section 3.8.4.3.1, which incorporates the U.S. EPR FSAR Section 3.8.4.3.1 by reference.

b. Live Loads

Live loads for the CWS MWIS are in accordance with COLA FSAR Section 3.8.4.3.1. The live loads include the loads due to rain, snow and ice and are based on the site-specific conditions. The live loads of the CWS MWIS further include loads consistent with the equipment layout within the structure.

c. Seismic Loads

The CWS MWIS, including the pump house enclosure, is included in the SSI model for the UHS MWIS and Forebay. The CWS MWIS is analyzed and designed to meet the same design requirements as a Seismic Category I Structure. Hence, the CWS MWIS is designed to prevent failure under SSE conditions with a margin of safety equivalent to that of a Category I structure. This meets Acceptance Criteria 8.C of SRP 3.7.2.

d. Wind Loads

The CWS MWIS structure is a site-specific structure and is designed for site-specific wind loads. The site-specific wind parameters (i.e. basic wind speed, 100-year recurrence interval wind speed) and applicable codes and guidelines (e.g., importance factor of 1.15) for the determination of site specific wind loads were included in COLA FSAR Section 3.3.1.

e. Tornado Loads

Tornado loads for the analysis and design of CWS MWIS are in accordance with COLA FSAR Section 3.3.2. Design basis tornado characteristics and tornado missile parameters are in accordance NRC RG 1.76, Revision 1. Tornado wind loads are converted to wind pressure loads according to SEI/ASCE 7-05 guidelines.

f. Load Combinations

Load combinations for the analysis and design of the CWS MWIS are consistent with those used for the analysis and design of Seismic Category I structures, as described in COLA FSAR Section 3.8.4.3.2, which incorporates the U.S. EPR FSAR Section 3.8.4.3.2 by reference.

4. Analysis Procedures

Finite element methods are utilized to analyze the CWS MWIS for applicable loads and load combinations. For seismic loads, the CWS MWIS structure is designed to maintain a margin of safety equivalent to that of Seismic Category I structures. The margin of safety equivalent to that of Seismic Category I structures is achieved by analyzing and designing the CWS MWIS to the same requirements as a Seismic Category I structure.

5. Materials

Concrete and reinforcing steel materials for the CWS MWIS conform to those for site-specific Seismic Category I structures which are discussed in COLA FSAR Section 3E.4.2. The concrete used for the CWS MWIS has a minimum design compressive strength of 5000 psi.

6. Acceptance Criteria

Since the CWS MWIS is designed to the same requirements as the Seismic Category I structures, the structural acceptance criteria for the CWS MWIS is identical to those for Seismic Category I structures, which are outlined in COLA FSAR Section 3.8.4.5, which incorporates the U.S. EPR FSAR Section 3.8.4.5 by reference.

The elastic displacements of the CWS MWIS are computed using finite element analysis methods.

The Seismic Category II Circulating Water Makeup Intake Structure is situated between the Seismic Category I Buried Intake Pipes ~~and is comprised of a reinforced concrete embedded structure and an above ground steel structure. The reinforced concrete embedded structure is integrally connected to the Seismic Category I Forebay and is designed to the same requirements as a Seismic Category I structure~~. The Seismic Category I Buried Intake Pipes are approximately 15 ft (4.6 m) away from the embedded walls of the Circulating Water Makeup Intake Structure. There is no possibility of any seismic interaction between the Buried Intake Pipes and the Circulating Water Makeup Intake Structure. Therefore, the design methodology for the reinforced concrete embedded structure meets NUREG-0800 Section 3.7.2, Acceptance Criterion 8.C (NRC, 2007a).

Enclosure 2

Table of Changes to CCNPP Unit 3 COLA Associated with Response to RAI No. 367

Table of Changes to CCNPP Unit 3 COLA Associated with Response to RAI No. 367

Change ID #	Ref	Part 2 Section	Type of Change	Description of Change
			Part 2 FSAR	
CC3-09-0395	UN#09-519	3.7.2.8	Incorporate COLA markups associated with the responses to RAI sets 19, 25, 58, 63, 65,112,113,139, 158,159,167,168, 179,180, 181, and 193.	The responses to these RAI sets resulted in a rewrite of FSAR 3.7.
CC3-12-0093	UN#12-038	3.7.2.8	Incorporate COLA markups associated with the response to RAI 334 Question 14.03.02-19.	The response to RAI 334 added design information to FSAR 3.7.2.8. This response did not overwrite earlier responses.
CC3-12-0216	UN#12-133	3.7.2.8	Incorporate COLA markups associated with the response to RAI 367 Question 14.03.02-20.	The response to RAI 367 added design information to FSAR 3.7.2.8. This response did not overwrite earlier responses.