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UniStar
NUCLEAR ENERGY

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January 29, 2010

UN#10-017

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 No. 118, Structural and Systems Engineering –
Inspections, Tests, Analyses, and Acceptance Criteria

References:
1) John Rycyna (NRC) to Robert Poche (UniStar Nuclear Energy), "FINAL RAI No 118 SEB 2198.doc (Public)" email dated May 15, 2009

2) UniStar Nuclear Energy Letter UN#09-496, from Greg Gibson to Document Control Desk, U.S. NRC, Submittal of Response to RAI No. 118, Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC), dated December 04, 2009

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 May 15, 2009 (Reference 1). This RAI addresses Structural and Systems Engineering - Inspections, Tests, Analyses, and Acceptance Criteria, as discussed in Appendix B of the Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC), as submitted in Part 10 of the Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 3 Combined License Application (COLA), Revision 6.

Reference 2 anticipated that the response to Question 14.03.02-2, Items F and M would be provided by January 29, 2010.

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The enclosure provides our response to RAI No. 118, Question 14.03.02-2, Item M, 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.

UniStar Nuclear Energy requires additional time to finalize the response to RAI No. 118, Question 14.03.02-2 F. A response to this question will be provided to the NRC by March 31, 2010.

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. Michael J. Yox at (410) 470-6317.

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

Executed on January 29, 2010

Greg Gibson

Enclosure: Response to NRC Request for Additional Information RAI No. 118, Question 14.03.02-2 Items M, Structural and Systems Engineering - Inspections, Tests, Analyses, and Acceptance Criteria, 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)
Loren Plisco, Deputy Regional Administrator, NRC Region II (w/o enclosure)
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GTG/JV/mdf

Enclosure

Response to NRC Request for Additional Information
RAI No. 118, Question 14.03.02-2 Item M, Structural and Systems Engineering - Inspections, Tests, Analyses, and Acceptance Criteria,
Criteria Calvert Cliffs Nuclear Power Plant, Unit 3

RAI No. 118

Question 14.03.02-2 Item M

Calvert Cliffs Unit 3 COL Application, Part 10 – ITAAC, Appendix B Tables 2.4-11 through 2.4-20 are for non-Category I structures. The acceptance criteria state that a report exists and concludes that under seismic loads the as-built structure will not impact the ability of any safety-related structure, system or component to perform its safety function.

SRP 3.7.2 states that all non-Category I structures should be assessed to determine whether their failure under SSE conditions could impair the integrity of seismic Category I SSCs, or result in incapacitating injury to control room occupants. Each non-Category I structure should meet at least one of the following criteria:

A. The collapse of the non-Category I structure will not cause the non-Category I structure to strike a Category I SSC.

B. The collapse of the non-Category I structure will not impair the integrity of seismic Category I SSCs, nor result in incapacitating injury to control room occupants.

C. The non-Category I structure will be analyzed and designed to prevent its failure under SSE conditions, such that the margin of safety is equivalent to that of Category I structures.

For each of the structures included in ITAAC Tables 2.4-11 through 2.4-20, explain which of the above three criteria are being utilized to satisfy the requirements for design of non-Category I structures. Each ITAAC should provide the following information:

1. If criterion A is utilized, the ITAAC should provide the minimum separation distance of the structure from all Category I SSCs. The ITAAC should also include a reference to the technical basis for this separation distance.

2. If criterion B is utilized, the ITAAC should provide the technical basis for the determination that collapse of the non-Category I structure is acceptable. This should include a description of any additional loads imposed on any Category I SSCs that could be impacted and the method used to conclude that these loads are not damaging. Also, any protective shields installed to prevent direct impact on Category I SSCs should be described.

3. If criterion C is utilized the ITAAC should provide or reference the analysis and design procedures used to demonstrate that, under SSE conditions, the margin of safety for the structure is equivalent to that of Category I structures.

Response

ITAAC Tables 2.4-11 through 2.4-20 provide the acceptance criteria for the inspection, testing and/or analyses of ten (10) non-Seismic Category I structures to ensure that the as-built structure will not impact the ability of Seismic Category I structures, systems, and components (SSCs) to perform their safety function. The information requested in the NRC question is provided below for each of these structures.

The separation distance of various non-Seismic Category I structures, except the Turbine Building, Switchgear Building, and Circulating Water System Makeup Water Intake Structure, from the nearest Seismic Category I structure is provided in Table 1. The height of these structures is significantly less than the separation distances, and therefore, the collapse of these structures cannot impact the safety function of Seismic Category I SSCs, meeting the Acceptance Criteria 8.A of Standard Review Plan (SRP) 3.7.2.

Table 1: Separation Distances of non-Seismic Category I Structures from the nearest Seismic Category I SSCs

Non-Safety Related Structure	FSAR Reference Figure(s)	Conservative Distance to Nearest Seismic Category I Structure	SRP 3.7.2 Acceptance Criterion
Turbine Building	2.1-5	See response text.	
Switchgear Building	2.1-5	See response text.	
Storage Warehouse[2]	2.1-5	200 ft	8.A
Central Gas Supply Building	2.4-2	1600 ft	8.A
Security Access Facility	2.1-5	200 ft	8.A
Grid Systems Control Bldg[1]	2.1-5, 2.4-2	700 ft	8.A
Circulating Water System Cooling Tower[3]	2.4-2	1800 ft	8.A
Circulating Water System Pump Building (Located adjacent to Cooling Tower in Plant N-E direction)	2.4-2	1700 ft	8.A
Circulating Water System Makeup Water Intake Structure[4]	2.4-51, 9.2-4	See response text.	
Desalinization/Water Treatment Plant[5]	2.4-2	1600 ft	8.A

Notes:

1. Grid Systems Control Building is called Switchyard Control House in Figure 2.4-2.
2. Storage Warehouse is called as Workshop & Warehouse Building in Figure 2.1-5 and as Warehouse Building in ITAAC Table 2.4-13.
3. Circulating Water System Cooling Tower is called Cooling Tower in Figure 2.4-2.
4. Circulating Water System Makeup Water Intake Structure is called CW Makeup Intake Structure in Figure 2.4-51.
5. Desalinization/Water Treatment Plant is called Desalinization Structure in Figure 2.4-2.

Turbine and Switchgear Buildings

The Turbine Building and Switchgear Building are classified as Seismic Category II structures. The Turbine Building and Switchgear Building together comprise the common Turbine Island (TI) structure. The TI structure is analyzed and designed for site-specific SSE loads such that the separation distance between these structures and the nearest Seismic Category I SSCs will exceed the sum of the maximum relative seismic displacement between the structures, construction tolerances, and settlement effects, by an appropriate factor of safety. This methodology will preclude the seismic interaction of the TI structure with Seismic Category I SSCs.

Circulating Water System (CWS) Makeup Water Intake Structure (MWIS)
The reinforced concrete embedded structure of the Seismic Category II CWS MWIS is analyzed and designed to the same requirements as a Seismic Category I structure. This design methodology meets the Acceptance Criteria 8.C of SRP 3.7.2.

The safety-related buried intake pipes are situated approximately 15 ft away from the embedded walls of the CWS MWIS, and there is no possibility of seismic interaction between the CWS MWIS and the buried intake pipes. The seismic interaction of the aboveground steel superstructure with the Seismic Category I SSCs is prevented by demonstrating that the collapse of the steel superstructure does not impair the integrity of Seismic Category I SSCs. Therefore, the design methodology for the steel superstructure meets the Acceptance Criteria 8.B of SRP 3.7.2.

COLA Impact

The CCNPP Unit 3 COLA Part 10 (ITAAC) Appendix B Tables 2.4-11 through 2.4-20 will be updated as follows in a future COLA revision.

Table 2.4-11—{Turbine Building Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	a. The Turbine Building is located in a radial position with respect to the Reactor Building, but is independent from the Nuclear Island. b. The Turbine Building is oriented to minimize the effects of any potential turbine generated missiles.	a. An inspection of the as-built structure will be conducted. b. An analysis of the as-built structure's location and orientation will be conducted.	a. The as-built Turbine Building location is in a radial position with respect to the as-built Reactor Building, and is independent from the as-built Nuclear Island. b. The as-built Turbine Building's location and orientation are consistent with the assumptions utilized in the analysis of the potential turbine missiles.
2	The Turbine Building will not impact the ability of any safety-related structure, system, or component to perform its safety function following a seismic event.	An inspection and/or analysis of the as-built structure will be conducted.	A report exists and concludes that under seismic loads the as-built Turbine Building will not impact the ability of any safety-related structure, system or component to perform its safety function. The report confirms that the Safe Shutdown Earthquake (SSE) load combinations specified in AISC N690 and ACI 349, as applicable, are used for the design of the Lateral Force Resisting System of the Turbine Building. In addition, the report confirms that the separation distance between the as-built Turbine Building and the nearest Seismic Category I structure, system or component is sufficient to preclude interaction.
3	The Turbine Building houses the components of the steam condensate main feedwater cycle, including the turbine-generator.	An inspection of the as-built structure will be conducted.	The as-built Turbine Building houses the components of the steam condensate main feedwater cycle, including the turbine-generator, in accordance with the design.

Table 2.4-12—{Switchgear Building Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	The Switchgear Building is located adjacent to and contiguous with the Turbine Building.	An inspection of the as-built structure will be conducted.	The as-built Switchgear Building is located adjacent to and contiguous with the as-built Turbine Building.
2	The Switchgear Building will not impact the ability of any safety-related structure, system, or component to perform its safety function following a seismic event.	An inspection and/or analysis of the as-built structure will be conducted.	A report exists and concludes that under seismic loads the as-built Switchgear Building will not impact the ability of any safety-related structure, system or component to perform its safety function. The report confirms that the Safe Shutdown Earthquake (SSE) load combinations specified in AISC N690 and ACI 349, as applicable, are used for the design of the Lateral Force Resisting System of the Switchgear Building. In addition, the report confirms that the separation distance between the as-built Switchgear Building and the nearest Seismic Category I structure, system or component is sufficient to preclude interaction.
3	The Switchgear Building contains the power supplies and the instrumentation and controls for the Turbine Island, the balance of plant, and the SBO diesel generators.	An inspection of the as-built structure will be conducted.	The as-built Switchgear Building houses the power supplies and the instrumentation and controls for the Turbine Island, the balance of plant, and the SBO diesel generators, in accordance with the design.
4	The configuration of the Switchgear Building separates each SBO Diesel Generator and its supporting equipment from the other equipment in the Switchgear Building or Turbine Building by barriers, doors, dampers	a. An analysis will be performed to establish that the fire barriers, doors, dampers, and penetrations have the appropriate fire rating. b. An inspection of the as-built barriers, doors, dampers, and penetrations	a. The fire barriers, doors, dampers, and penetrations that separate each SBO Diesel Generator and its supporting equipment from the other equipment in the as-built Switchgear Building or as-built Turbine Building consist of the following:

	and penetrations as follows: 1. 3-hour fire rated barriers separate the Station Blackout diesel tank rooms from the other adjacent areas. 2. 3-hour fire rated barriers separate the adjacent Turbine Building. 3. 2-hour rated fire barriers separate all other contiguous areas, as well as redundant trains within those areas. 4. Door openings, ventilation system openings, and ductwork penetrations that penetrate 3-hour rated fire barriers will have at least 3-hour fire rated doors or 3-hour fire rated dampers. 5. Door openings, ventilation system openings, and ductwork penetrations that penetrate 2-hour rated fire barriers will have at least 1-½ hour fire rated doors or 1-½ hour fire rated dampers. 6. Penetrations through fire rated walls, floors, and ceilings are sealed or otherwise closed with rated penetration seal assemblies.	will be conducted.	1. 3-hour fire rated barriers separate the SBO diesel tank rooms from the other adjacent. 2. 3-hour fire rated barriers separate the adjacent Turbine Building. 3. 2-hour rated fire barriers separate all other contiguous areas, as well as redundant trains within those areas. 4. Door openings, ventilation system openings, and ductwork penetrations that penetrate 3-hour rated fire barriers are at least 3-hour fire rated doors or 3- hour fire rated dampers. 5. Door openings, ventilation system openings, and ductwork penetrations that penetrate 2-hour rated fire barriers are at least 1-½ hour fire rated doors or 1-½ hour fire rated dampers. 6. Penetrations through fire rated walls, floors, and ceilings are sealed or otherwise closed with 3-hour rated penetration seal assemblies. b. The configuration of fire barriers, doors, dampers, and penetrations that separate each SBO Diesel Generator and its supporting equipment from the other equipment in the as-built Switchgear Building or as-built Turbine Building conforms to the design.

Table 2.4-13—{Warehouse Building Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	The Warehouse Building will not impact the ability of any safety- related structure, system, or component to perform its safety function following a seismic event.	An inspection and/or analysis of the as-built structure will be conducted.	A report exists and concludes that under seismic loads the as-built Warehouse Building will not impact the ability of any safety-related structure, system or component to perform its safety function. The report confirms that the minimum separation distance of the as-built Warehouse Building from the nearest Seismic Category I structure, system or component is approximately 200 ft, as depicted in FSAR Figure 2.1-5. Seismic interaction is precluded based on Acceptance Criteria 8.A of SRP 3.7.2.

Table 2.4-14—{Security Access Building Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	The Security Access Building will not impact the ability of any safety-related structure, system, or component to perform its safety function following a seismic event.	An inspection and/or analysis of the as-built structure will be conducted.	A report exists and concludes that under seismic loads the as-built Security Access Building will not impact the ability of any safety-related structure, system or component to perform its safety function. The report confirms that the minimum separation distance of the as-built Security Access Building from the nearest Seismic Category I structure, system or component is approximately 200 ft, as depicted in FSAR Figure 2.1-5. Seismic interaction is precluded based on Acceptance Criteria 8.A of SRP 3.7.2.
2	The Security Access Building controls access to the plant's controlled areas.	An inspection of the as-built structure will be conducted.	The as-built Security Access Building provides access to the plant's controlled areas.

Table 2.4-15—{Central Gas Supply Building Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	The Central Gas Supply Building will not impact the ability of any safety-related structure, system, or component to perform its safety function following a seismic event.	An inspection and/or analysis of the as-built structure will be conducted.	A report exists and concludes that under seismic loads the as-built Central Gas Supply Building will not impact the ability of any safety-related structure, system or component to perform its safety function. The report confirms that the minimum separation distance of the as-built Central Gas Supply Building from the nearest Seismic Category I structure, system or component is approximately 1600 ft, as depicted in FSAR Figure 2.4-2. Seismic interaction is precluded based on Acceptance Criteria 8.A of SRP 3.7.2.

Table 2.4-16—{Grid Systems Control Building Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	The Grid Systems Control Building will not impact the ability of any safety-related structure, system, or component to perform its safety function following a seismic event.	An inspection and/or analysis of the as-built structure will be conducted.	A report exists and concludes that under seismic loads the as-built Grid Systems Control Building will not impact the ability of any safety-related structure, system or component to perform its safety function. The report confirms that the minimum separation distance of the as-built Grid Systems Control Building from the nearest Seismic Category I structure, system or component is approximately 700 ft, as depicted in FSAR Figures 2.1-5 and 2.4-2. Seismic interaction is precluded based on Acceptance Criteria 8.A of SRP 3.7.2.

Table 2.4-17—{Circulating Water Cooling Tower Structure Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	The Circulating Water Cooling Tower Structure will not impact the ability of any safety-related structure, system, or component to perform its safety function following a seismic event.	An inspection and/or analysis of the as-built structure will be conducted.	A report exists and concludes that under seismic loads the as-built Circulating Water Cooling Tower Structure will not impact the ability of any safety-related structure, system or component to perform its safety function. The report confirms that the minimum separation distance of the as-built Circulating Water Cooling Tower Structure from the nearest Seismic Category I structure, system or component is approximately 1800 ft, as depicted in FSAR Figure 2.4-2. Seismic interaction is precluded based on Acceptance Criteria 8.A of SRP 3.7.2.

Table 2.4-18—{Circulating Water Pump Building Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	The Circulating Water Pump Building will not impact the ability of any safety-related structure, system, or component to perform its safety function following a seismic event.	An inspection and/or analysis of the as-built structure will be conducted.	A report exists and concludes that under seismic loads the as-built Circulating Water Pump Building will not impact the ability of any safety-related structure, system or component to perform its safety function. The report confirms that the minimum separation distance of the as-built Circulating Water Pump Building from the nearest Seismic Category I structure, system or component is approximately 1700 ft, as depicted in FSAR Figure 2.4-2. Seismic interaction is precluded based on Acceptance Criteria 8.A of SRP 3.7.2.

Table 2.4-19—{Circulating Water Makeup Intake Structure Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	The Circulating Water Makeup Intake Structure will not impact the ability of any safety-related structure, system, or component to perform its safety function following a seismic event.	An inspection and/or analysis of the as-built structure will be conducted.	A report exists and concludes that under seismic loads the as-built Circulating Water Makeup Intake Structure will not impact the ability of any safety-related structure, system or component to perform its safety function. The report confirms that the: · As-built reinforced concrete embedded structure of the Circulating Water Makeup Intake Structure is designed to the same requirements as a Seismic Category I structure, thus meeting Acceptance Criteria 8.C of SRP 3.7.2. · Collapse of above-grade steel superstructure does not impair the integrity of Seismic Category I structures, systems or components, nor result in incapacitating injury to control room occupants.

Table 2.4-20—{Desalinization / Water Treatment Building Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	The Desalinization / Water Treatment Building will not impact the ability of any safety-related structure, system, or component to perform its safety function following a seismic event.	An inspection and/or analysis of the as-built structure will be conducted.	A report exists and concludes that under seismic loads the as-built Desalinization / Water Treatment Building will not impact the ability of any safety-related structure, system or component to perform its safety function. The report confirms that the minimum separation distance of the as-built Desalination / Water Treatment Building from the nearest Seismic Category I structure, system or component is approximately 1600 ft, as depicted in FSAR Figure 2.4-2. Seismic interaction is precluded based on Acceptance Criteria 8.A of SRP 3.7.2.