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10 CFR 50.4
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October 22, 2010

UN#10-272

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. 177, Fire Protection Program

- References:
- 1) Surinder Arora (NRC) to Robert Poche (UniStar Nuclear Energy), "FINAL RAI No 177 SBPA 3696," email dated October 2, 2009
 - 2) UniStar Nuclear Energy Letter UN#10-251, from Greg Gibson to Document Control Desk, U.S. NRC, Response to RAI No. 177, Fire Protection Program, dated September 28, 2010

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 October 2, 2009 (Reference 1). This RAI addresses the Fire Protection Program, as discussed in Section 9.5.1 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 6.

Reference 2 provided an October 22, 2010 schedule for the response for RAI 177, Question 09.05.01-14. The enclosure provides our response to RAI 177, Question 09.05.01-14 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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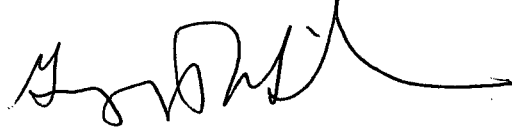
Additional information describing the Turbine Island structure design criteria will be included with the FSAR Section 3.7.2.8 update being prepared to support the response to RAI 253, Question 03.07.02-46 (currently scheduled for March 31, 2011).

Our responses do 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 October 22, 2010

A handwritten signature in black ink, appearing to read 'Greg Gibson', with a long horizontal flourish extending to the right.

Greg Gibson

Enclosure: Response to NRC Request for Additional Information, RAI No. 177, Question 09.05.01-14 Fire Protection Program, 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)
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 No. 177, Question 09.05.01-14, Fire Protection Program,
Calvert Cliffs Nuclear Power Plant, Unit 3**

RAI No 177

Question 09.05.01-14

RG 1.189 Regulatory Position 7.2 states that "The turbine building should be separated from adjacent structures containing equipment important to safety by a fire barrier with a rating of at least 3 hours. The fire barriers should be designed to maintain structural integrity even in the event of a complete collapse of the turbine structure. Openings and penetrations in the fire barrier should be minimized and should not be located where the turbine oil system or generator hydrogen cooling system creates a direct fire exposure hazard to the barrier." It is not apparent from Section 9.5.1 and Figures 9B-1 through 7 if the turbine building wall facing the nuclear island is a 3 hour rated barrier and whether the barrier is designed to maintain structural integrity even in the event of a complete collapse of the turbine structure. It is also not apparent from Section 9.5.1 and Figures 9B-1 through 7 if the turbine building wall facing the Switchgear Building is designed to maintain structural integrity even in the event of a complete collapse of the turbine structure. The applicant needs to follow the guidance in RG 1.189 or demonstrate that the existing barriers are acceptable and revise Section 9.5.1 and Figures 9B-1 through 7, as applicable. Additionally in the above figures, explain the meaning of Alternate in "Alternate Turbine Building".

Response

The nomenclature "Alternate Turbine Building" used in Figures 9B-1 through 9B-9 will be revised to "Turbine Building."

Exposure of Safety Related Structures to Turbine Island Fire

The Turbine Island (TI) structure (i.e., combined Turbine and Switchgear Buildings) wall facing the Nuclear Island does not constitute a fire barrier. However, as shown in the U.S. EPR FSAR Figures 9A-19 through 27, the outside aircraft protection shield wall of the adjacent Safeguards Buildings 2 & 3 (SG 2/3) is a 3-hour rated fire barrier in accordance with RG 1.189 Position C7.2. Openings and penetrations in this wall will be minimized so that the turbine oil system or generator hydrogen cooling system does not create a direct fire exposure hazard to the safety-related systems and components located in the Nuclear Island structures.

Other safety-related structures, including the Emergency Power Generating Buildings (1-4UBP) and the Essential Service Water (ESW) Buildings (3-4URB), are spatially separated from the TI structure by more than 50 ft as discussed in Section 8.1.1.3 of NFPA 804 (2006) and are therefore not subject to fire exposure from the Turbine Island structure.

TI Structure Collapse onto Safety Related Structures

The design features of the TI structure ensure the integrity of the fire barrier wall between the Seismic Category II TI structure and adjacent Seismic Category I (SC I) SG 2/3 during a postulated collapse of TI structure under a fire according to RG 1.189 position C7.2.

The designated fire barrier wall between the TI structure and the immediately adjacent SG 2/3 is a nominally six-foot thick reinforced concrete aircraft protection shield integral with the Nuclear Island Common Basemat and Reactor Shield Building. As such, this wall must remain intact in the case of fire-induced collapse of the TI structure onto this wall.

The design of the TI structure includes nominally three-foot thick reinforced concrete shear walls aligned along the east-west direction at and below the Turbine Generator (TG) operating deck of the Turbine Building. The reinforced concrete shear walls and the reinforced concrete floor diaphragms are designed to prevent collapse of the Turbine Building at and below the operating deck in the east-west direction perpendicular to SG 2/3 (Figure 1). Thus, the design eliminates the potential for lateral impact of the substantial mass associated with self weight and equipment weight of the Turbine Building at and below the operating deck level onto the SG 2/3 wall. Figure 1 illustrates the conceptual locations of the reinforced concrete walls in the plan.

Structural steel vertical bracings are used above the operating deck along the east-west direction. The vertical bracings, in conjunction with the aforementioned reinforced concrete shear walls and floor diaphragms, create a dual Lateral Force Resisting System (LFRS). During a fire, this LFRS limits the collapse of the building to the portion of the structure above the operating deck level in this direction. The steel frame above the operating deck level at Column Line A is postulated to collapse towards the SG 2/3 and impact the SG 2/3 roof. Also postulated is drop of the main crane trolley, bridge girder and structural steel framing components onto the SG 2/3 roof.

Analyses were performed to assess the effects of these impact loads on the SG 2/3 roof. One set of analyses confirm that there is no perforation/penetration of the SG 2/3 roof slab. Other analyses confirm that impulse loading of the various components is enveloped by the impulse loading of the aircraft impact.

Along the north-south direction, the LFRS typically consists of structural steel bracing below the operating deck and a moment frame above the operating deck. Figure 2 conceptually illustrates this portion of the LFRS. Fire-induced collapse of the TI structure in the north-south direction is not prevented.

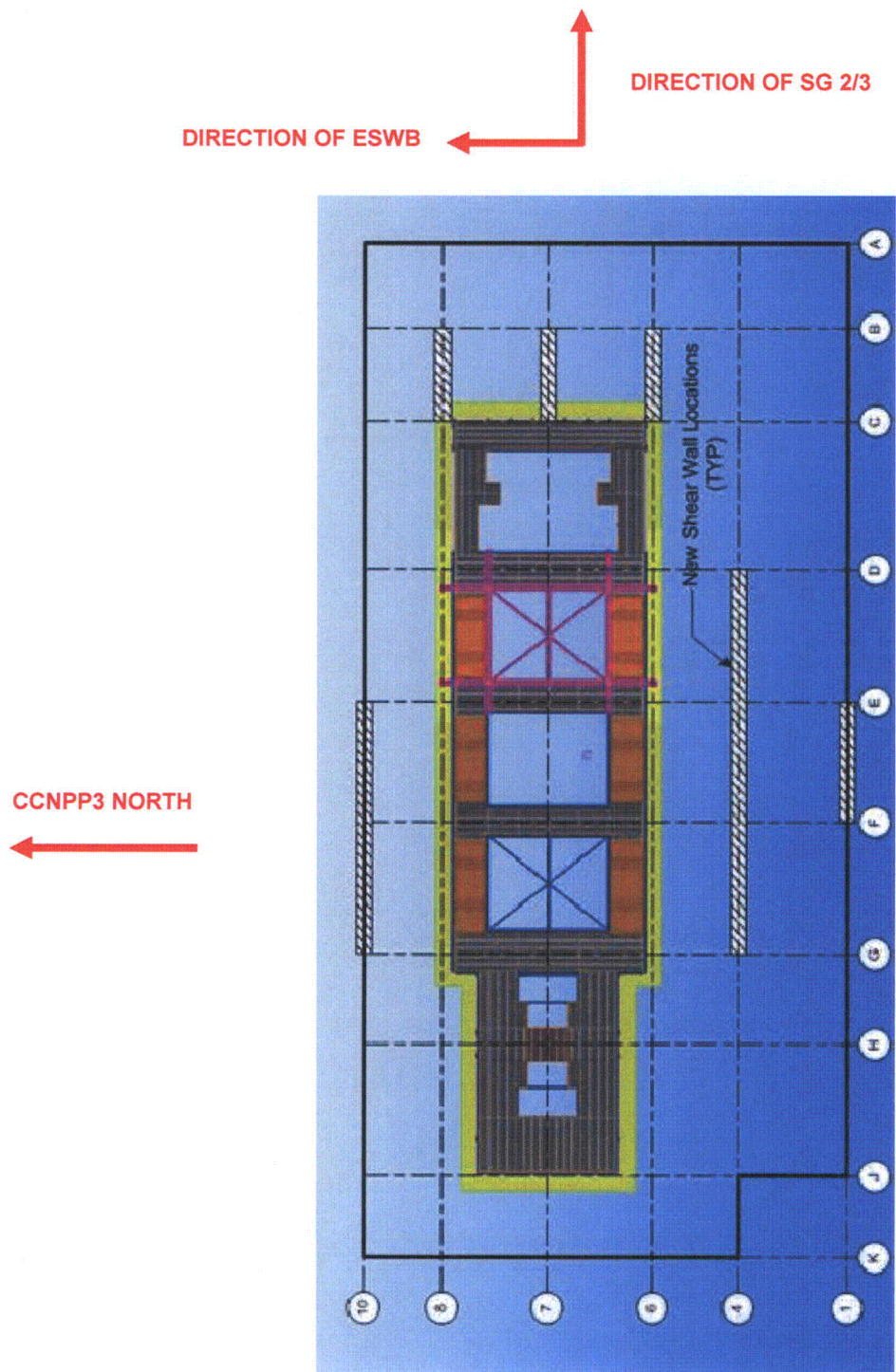


Figure 1 – Schematic Plan of TI Structure Shear Walls

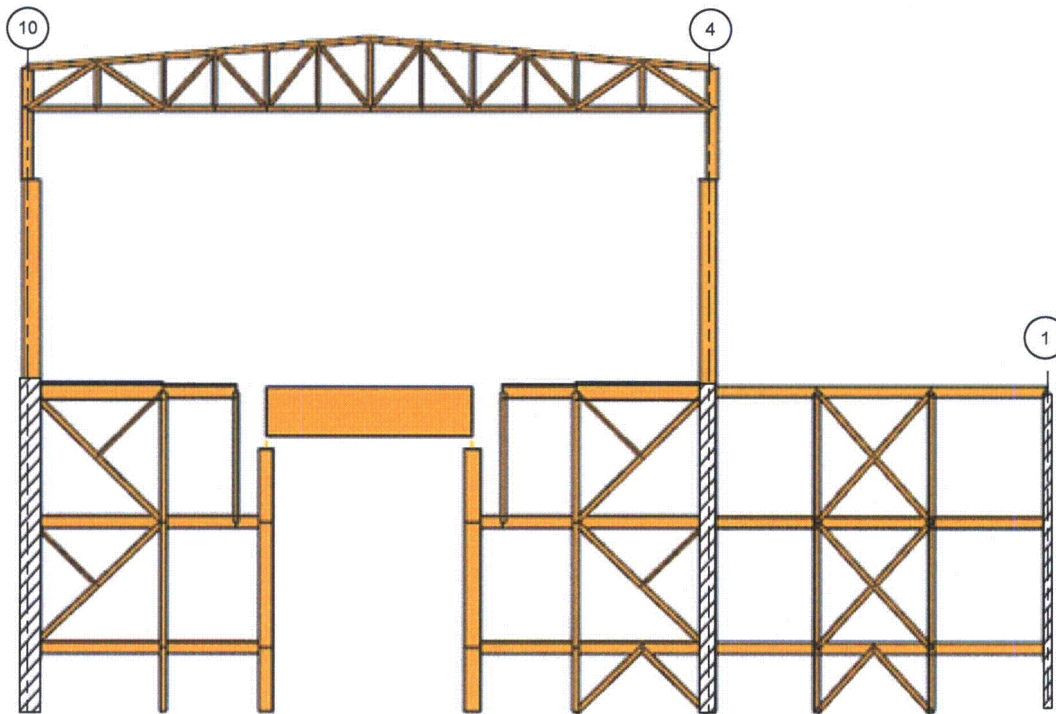


Figure 2: Typical TI Structure Cross Section at Column Line F (Looking East)

In the case of postulated collapse of the TI structure in the north direction directly onto the adjacent Seismic Category I Essential Service Water (ESW) Building 3 (3URB), it has been confirmed that the effects of the impact are limited to the 3URB. Thus, TI structure impact onto a second ESW Building directly or indirectly (i.e., 3URB impacting 4URB following postulated impact of TI structure with 3URB) is not credible. Therefore, if one ESW Building is not in service due to maintenance, two of the four ESW Buildings remain available to achieve safe-shutdown following a postulated collapse of the TI structure in the north direction.

Turbine Building Collapse onto the Switchgear Building

The Switchgear Building is not a safety-related structure and it does not contain safety-related systems or components. Therefore, the guidance in Section 7.2 of Regulatory Guide 1.189 does not apply and collapse of the Turbine Building onto the Switchgear Building does not affect the safe shutdown of the plant. The response to NRC RAI 177, Question 9.05.01-13¹ provides further clarification on Switchgear Building SSCs. The fire barrier separating the Turbine and Switchgear Buildings is not required to maintain its structural integrity in the event of complete collapse of the TI structure; it is only designed to prevent the spread of fire.

Turbine Building Fire Area Parameters

FSAR Table 9B-2 is being updated to indicate that no SSCs important to safety are located within the Oil Discharge Tank Room (FA-UMA-07) or the Lube Oil Room (FA-UMA-08).

¹ G. Gibson (UniStar Nuclear Energy) to Document Control Desk (NRC), "Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3, RAI No. 177, Fire Protection Program," letter UN#09-522, dated December 17, 2009.

COLA Impact

A description of the Turbine Island structure design criteria will be included in the FSAR Section 3.7.2.8 update being prepared to support the response to RAI 253, Question 03.07.02-46 (currently scheduled for March 31, 2011²).

The nomenclature "Alternate Turbine Building" used in Figures 9B-1 through 9B-9 will be revised to "Turbine Building." Updated Figures 9B-1 through 9B-9 will also be included in the FSAR Section 3.7.2.8 update being prepared to support the response to RAI 253, Question 03.07.02-46.

FSAR Table 9B-2 will be updated as follows in a future COLA revision:

² G. Gibson (UniStar Nuclear Energy) to Document Control Desk (NRC), "Ultimate Heat Sink Makeup Water Intake Structure and Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3, RAI 253, System Analysis," letter UN#10-248, dated September 27, 2010.

Table 9B-2 – {Fire Area Parameters}

Column	6	7	8	9	10
Fire Area	FA-UMA-06	FA-UMA-07	FA-UMA-08	FA-UBA-01	FA-UBA-02
Building or Area	UMA	UMA	UMA	UBA	UBA
Figures	Figures 9B-1 through 9B-4, 6	Figures 9B-2, 9	Figures 9B-3, 7, 8	Figures 9B-10,14	Figures 9B-11, 12, 13, 14
Fire Barriers (Notes 3,4,5,6)	See Figures	See Figures	See Figures	See Figures	See Figures
SSC: important to safety	None	Yes <u>None</u>	Yes <u>None</u>	None	None