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NUCLEAR ENERGY

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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. 25, Revision 2 – Seismic Instrumentation

References: 1) John Rycyna (NRC) to G. Wrobel (UniStar), "RAI No 25 RGS 1145.doc," email dated October 21, 2008

The purpose of this letter is to respond to a request for additional information (RAI) identified in the NRC e-mail correspondence to UniStar Nuclear, dated October 21, 2008 (Reference 1). This RAI addresses Seismic Instrumentation, as discussed in Section 3.7.4.2.1 of the Final Safety Analysis Report, as submitted in Part 2 of the Calvert Cliffs Nuclear Power Plant Unit 3 Combined License Application (COLA).

The enclosure provides our response to RAI No. 25, Revision 2, Questions 03.07.04-2 and 03.07.04-3. Our response includes revised COLA content. A Licensing Basis Document Change Request has been initiated to incorporate the change in a future revision of the COLA. Our response to these RAI questions does not include any new regulatory commitments.

If there are any questions regarding this transmittal, please contact me at (410) 470-4205, or Mr. Michael J. Yox at (410) 495-2436.

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NRO

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

Executed on January 30, 2009

Greg Gibson

Enclosure: Response to NRC Request for Additional Information, RAI No. 25, Revision 2, Seismic Instrumentation

cc: John Rycyna, NRC Project Manager, U.S. EPR COL Application
Thomas Fredrichs, 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. 25, Revision 2

Seismic Instrumentation

RAI No. 25, Revision 2

Question 03.07.04-2

Regulatory Guide (RG) 1.12 states that "free-field sensors should be located and installed so that they record the motion of the ground surface and so that the effects associated with surface features, buildings, and components on the recorded ground motion will be insignificant."

In the applicant's FSAR, section 3.7.4.2.1, the applicant states that "[t]he free-field acceleration sensor is located on the base mat of the Fire Protection Building . . . . This location is sufficiently distant from nearby structures that they have no significant influence on the recorded free-field seismic motion."

According to the applicant's FSAR, Figure 1.2-1, the Fire Protection building is adjacent to two Fire Protection Storage Tanks. The NRC staff is concerned that these storage tanks may be potential sources of seismic noise, and requests the applicant to provide justification to show that the effects associated with these storage tanks are insignificant.

Response

The Fire Protection Storage Tank design is conceptual and will be finalized during detailed design. Once the tank design is complete, a soil-structure-interaction (SSI) analysis will be conducted to confirm that fire protection storage tank and other interactions do not significantly influence free-field acceleration sensor ability to accurately measure ground surface motion during a seismic event. This analysis is required by the ITAAC in U.S. EPR FSAR Tier 1, Table 2.4.7-1, item 2.1.

Should the SSI analysis find that Fire Protection Storage Tank, or other interactions, significantly influence free-field acceleration sensor ability to accurately measure ground surface motion during a seismic event the sensor will be moved to a suitable location. The specific location for the free-field acceleration sensor will be determined in accordance with the guidance provided in Regulatory Guide 1.12. The location will be sufficiently distant from nearby structures that may have significant influence on the recorded free-field seismic motion. The free-field acceleration sensor will be located on a base mat that is founded on material that is representative of that upon which the Nuclear Island (NI) and other Seismic Category I structures are founded. The sensor will be protected from accidental impact, and will be readily accessible for surveillance, maintenance, and repair activities. The sensor will be rigidly mounted in alignment with the orthogonal axes assumed for seismic analysis. To maintain occupational radiation exposures ALARA, the free-field acceleration sensor location will be sufficiently distant from radiation sources such that there is minimal occupational exposure expected during normal operating modes.

FSAR Impact

FSAR Section 3.7.4.2.1 will be updated as follows in a future COLA revision:

{The free-field acceleration sensor is located on the base mat of the Fire Protection Building, which is a small rectangular structure, located within the protected area and situated on plant grade. The centerline of the Radioactive Waste Processing Building, the nearest significant structure, is approximately two of its plan dimensions from the Fire Protection Building. The centerline of the NI Common base mat is approximately two of its equivalent diameters from the

Fire Protection Building. This location is sufficiently distant from nearby structures that they have no significant influence on the recorded free-field seismic motion.

In addition, the plan dimensions of the Fire Protection Building are small enough that its base mat will not have a significant filtering effect on the free-field motion. This area of the plant is also a quiet zone in that turbine-induced ground vibration will not significantly affect the free-field sensor.

The Fire Protection Building design is such that the free-field acceleration sensor is protected from damage and adverse interaction during a seismic event. Seismic load combinations for the Fire Protection Building are developed in accordance with requirements of ASCE 43-05 (ASCE, 2005) using a limiting acceptance condition for the structure characterized as essentially elastic behavior with no damage (i.e., Limit State D, as specified in the Standard). The Fire Protection Building is supported on material representative of that upon which the NI Common base mat Structures and other Seismic Category I structures are founded.

The sensor location is protected from accidental impact but is readily accessible for surveillance, maintenance, and repair activities. The sensor is rigidly mounted in alignment with the orthogonal axes assumed for seismic analysis. The free-field acceleration sensor location is sufficiently distant from radiation sources that there is no occupational exposure expected during normal operating modes, which is consistent with ALARA.}

A soil-structure-interaction (SSI) analysis will be conducted during final design of the Fire Protection Building and fire protection storage tanks to determine if the Fire Protection Building and/or fire protection storage tanks significantly influence the ability of the free-field acceleration sensor to accurately measure ground surface motion during a seismic event. Should the SSI analysis determine that the Fire Protection Building or fire protection storage tanks significantly influence free-field acceleration sensor ability to accurately measure ground surface motion during a seismic event the sensor will be moved to a suitable location. The location for the free-field acceleration sensor will be determined in accordance with the guidance provided in Regulatory Guide 1.12. The location will be sufficiently distant from nearby structures that may have significant influence on the recorded free-field seismic motion. The free-field acceleration sensor will be located on a base mat that is founded on material that is representative of that upon which the NI and other Seismic Category I structures are founded. The sensor will be protected from accidental impact, and will be readily accessible for surveillance, maintenance, and repair activities. The sensor will be rigidly mounted in alignment with the orthogonal axes assumed for seismic analysis. To maintain occupational radiation exposures ALARA, the free-field acceleration sensor location will be sufficiently distant from radiation sources such that there is minimal occupational exposure expected during normal operating modes.}

Question 03.07.04-3

Regulatory Guide (RG) 1.12 states that "free-field sensors should be located and installed so that they record the motion of the ground surface and so that the effects associated with surface features, buildings, and components on the recorded ground motion will be insignificant."

In the applicant's FSAR, section 3.7.4.2.1, the applicant states that "[t]he free-field acceleration sensor is located on the base mat of the Fire Protection Building . . . . This location is sufficiently distant from nearby structures that they have no significant influence on the recorded free-field seismic motion. . . . In addition, the plan dimensions of the Fire Protection Building are small enough that its base mat will not have a significant filtering effect on the free-field motion."

According to the applicant's FSAR, Figure 1.2-1, the plan dimensions of the Fire Protection Building are approximately 40 ft. by 20 ft. The NRC staff requests the applicants to provide additional information to justify their assumption that seismic records obtained in the Fire Protection Building will adequately reflect "free-field" conditions. This information should also include a discussion of the embedment depth of the foundation, and a description of how the acceleration sensor will be installed within the Fire Protection Building.

Response

The Fire Protection Building design is conceptual and will be finalized during detailed design. Once the Fire Protection Building design is complete, an appropriate soil-structure-interaction (SSI) analysis will be conducted to confirm that the Fire Protection Building does not have a significant filtering effect on the ability of the free-field acceleration sensor to accurately measure ground surface motion during a seismic event. This analysis is required by the ITAAC in U.S. EPR FSAR Tier 1, Table 2.4.7-1, item 2.1. Should the SSI analysis indicate that the Fire Protection Building will significantly influence the ability of the free-field sensor to perform its design function, the free-field sensor will be moved to a suitable location, as described in the response to RAI 25 Question 03.07.04-2.

FSAR Impact

The FSAR will be updated as described in the response to RAI Question 03.07.04-2 in a future COLA Revision.