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May 10, 2012

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U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**BELL BEND NUCLEAR POWER PLANT  
RESPONSE TO RAI NO. 97  
BNP-2012-120      Docket No. 52-039**

- References: 1) M. Canova (NRC) to R. R. Sgarro (PPL Bell Bend, LLC), Bell Bend COLA – Final Request for Information No. 97 (RAI No. 97) – SEB1 4671, email dated August 16, 2010
- 2) BNP-2012-072, R. R. Sgarro (PPL Bell Bend, LLC) to U.S. NRC, “Schedule Information for Responses to Requests for Additional Information for the Bell Bend FSAR,” dated March 14, 2012

The purpose of this letter is to respond to the Request for Additional Information (RAI) identified in Reference 1. In Reference 2, PPL Bell Bend, LLC (PPL) indicated that PPL would provide a response to RAI No. 97, Question 03.03.02-2 on or before May 15, 2012. This RAI addresses Tornado Loads as discussed in Section 3.3.2 of the Final Safety Analysis Report (FSAR), as submitted in Part 2 of the Bell Bend Nuclear Power Plant (BBNPP) Combined License Application (COLA)

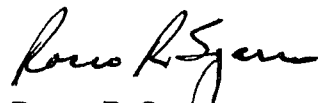
Enclosure 1 provides our response to RAI No. 97 Question 03.03.02-2, which includes revised COLA content. The revised COLA content will be included in a future revision of the BBNPP COLA. The future revision of the COLA is the only new regulatory commitment in this letter.

Should you have questions, please contact the undersigned at 610.774.7552.

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

Executed on May 10, 2012

Respectfully,

  
Rocco R. Sgarro

RRS/kw

Enclosures: As stated

D102  
MRB

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Enclosure 1

Response to RAI No. 97, Question 03.03.02-2

**RAI No. 97****Question 03.03.02-2**

This is a follow-up to RAI 46, Question 03.03.02-1

After reviewing the applicant's response to RAI 2451 (BBNP RAI No. 46, Question 03.03.02-1), the staff requires:

- 1 - The location and distances between safety-related structures and the non-safety-related structures listed in FSAR 3.3.2.3 (after the proposed power block relocation).
- 2 - The physical height and elevations of the non-safety-related structures listed in FSAR 3.3.2.3 (after the proposed power block relocation).
- 3 - The technical basis (or evaluation performed) to determine that the collapse of the non-safety-related structures from high winds or tornado loading would not result in transfer of unanalyzed loads.

This information is required to make a safety determination with regards to the effect of wind-borne missile impacts to safety related structures.

**Response**

Items 1 and 2:

The identified permanent non-safety-related structures at the Bell Bend Nuclear Power Plant (BBNPP) are listed in Table 1, below, and shown in annotated FSAR Figure 2.1-1, provided as Enclosure 2.

The heights of many of these structures are not finalized at this time. To determine the potential for interaction of these structures, with a safety-related structure, due to the effects of tornado loads, the separation distance (D) of each non-safety-related structure, from the nearest safety related structure, is provided in Table 1. Assessment of potential for interaction of each non-safety-related structure with the nearest safety-related structure is also provided. As shown in Table 1, most of these structures cannot adversely interact with safety-related structures due to their separation distance from the nearest safety-related structures. Therefore, these structures are not designed for tornado loadings. During detailed design of such structures, the heights and separation distances from safety-related structures will be maintained such that the failure of these structures due to tornado loads will not affect the ability of safety-related structures to perform their intended safety functions.

Based on Enclosure 2, the structures that are in close proximity to a safety-related structure, such that their failure could adversely affect the safety-related structure, will be designed to withstand the effects of tornado loading. The methods of analysis and design of such structures are discussed in response to Part 3 of the question.

Table 1 RAI 97 Separation Differences Between Safety-Related and Non-Safety-Related Structures				
Non-Safety Related Structure	Label on Annotated FSAR Fig. 2.1-1*	Conservative Distance to Nearest Safety-Related Structure (D) (feet [meters])	Nearest Safety-Related Structure/ Label on Annotated FSAR Fig. 2.1-1**	Potential Interaction w/ Safety-Related Structures (Yes/No)
Fire Protection Storage Tanks	P35	320 [97.5]	Safeguards Bldg. Electrical/P27	No <sup>2</sup>
Fire Protection Building	P36	352 [107.3]	Safeguards Bldg. Electrical/P27	No <sup>2</sup>
Security Access Facility	P37	231 [70.4]	Essential Service Water Cooling Tower/P34	No <sup>2</sup>
Switchgear Building	P38	30 [9.1]	Safeguards Bldg. Mechanical/P26	Yes <sup>1</sup>
500 kV GIS Switchyard Building	P39	304 [92.7]	ESWEMS Pond/P46	No <sup>2</sup>
Circulating Water System Cooling Towers	P40	512 [156.1]	Emergency Power Generating Bldg./P23	No <sup>3</sup>
Circulating Water System Pumphouse	P41	644 [196.3]	Essential Service Water Pump Bldg./P33	No <sup>2</sup>
BBNPP Intake Structure	P42	7,348 [2,239.7]	ESWEMS Pond/P46	No <sup>2</sup>
Water Treatment Building	P45	833 [253.9]	ESWEMS Pond/P46	No <sup>2</sup>
Demineralized Water Tanks	P43	67 [20.4]	Emergency Power Generating Bldg./P23	No <sup>4</sup>
Workshop & Warehouse Building	P44	254 [77.4]	Essential Service Water Cooling Tower/P34	No <sup>2</sup>
General Warehouse	P4	1,928 [587.7]	ESWEMS Pond/P46	No <sup>2</sup>
General Warehouse	P5	1,904 [580.3]	ESWEMS Pond/P46	No <sup>2</sup>
Office-Field Construction	P10	686 [209.1]	ESWEMS Pond/P46	No <sup>2</sup>
Potable Water Meter House	P11	1,780[542.5]	ESWEMS Pond/P46	No <sup>2</sup>
Permanent Training and Simulation	P14	1,146 [349.3]	Safeguards Bldg. Mechanical/P26	No <sup>2</sup>
Bechtel Construction Office Building	P17	902 [274.9]	Safeguards Bldg. Mechanical/P26	No <sup>2</sup>
Hazardous Waste Storage Building	P18	4,824 [1,470.4]	ESWEMS Pond/P46	No <sup>2</sup>
Central Gas Supply Building	P19	4,728[1,441.1]	ESWEMS Pond/P46	No <sup>2</sup>
Meteorological Tower	P21	2,093 [637.9]	ESWEMS Pond/P46	No <sup>2</sup>
Hydrogen Storage	P20	4,476 [1,364.3]	ESWEMS Pond/P46	No <sup>2</sup>
Combined Waste Water Retention Pond	P8	105 [32.0]	ESWEMS Pond/P46	No <sup>2</sup>

\* Buildings labeled with "T" are temporary buildings that will be removed prior to fuel load  
 \*\* ESWEMS Pond is Essential Service Water Emergency Makeup System Retention Pond

Notes:

1. See Part 3 Response
2. Height is much smaller than the separation distance. Therefore, there is no potential for interaction.
3. Based on historic data from the collapse of multiple cooling towers at Ferrybridge, U.K in 1965, structural failures are concentrated at the throat of a tower. The collapse of a large hyperbolic cooling tower is understood to fall no farther than its height from the centerline of the cooling tower. This distance from the cooling tower would be 300 ft (92 m), which is 162 ft (50 m) from the nearest safety-related building (Tower radius = 175 ft, Tower height = 475 ft; Therefore, 475 ft -175 ft = 300 ft from outer face).

4. Height of structure is about 50 ft (to be confirmed during detailed design), which is less than the 67 ft separation distance. Therefore, no potential for interaction exists.

### Item 3:

If sufficient separation distance is not available, adverse interaction can result from collapse (and subsequent impact) of non-safety-related structures on safety-related structures due to tornado loads, or from building components (in the form of missiles) generated by a tornado. Since safety-related structures are designed to withstand the tornado generated missiles spectrum described in FSAR Section 3.5.1.4, only proximity is considered here. Any non-safety related structure in Table 1 that is in close proximity, such that it could potentially interact with a safety-related structure, will be designed for tornado loading to preclude such adverse interaction. The non-safety-related structure identified in Table 1 that could potentially interact with safety-related structures is the Switchgear Building. The design methodology<sup>1</sup> for this structure is provided below:

Switchgear Building: This non-safety-related structure is approximately 30 ft from the safety related nuclear island (NI) Common Basemat Structures shown in Enclosure 2. The Switchgear Building is designed to withstand tornado loads as defined in the last paragraph of US EPR FSAR Section 3.3.2.2. The Switchgear Building structural system will use engineered pressure relief siding panels to mitigate effects of tornado loading, and therefore, it will be designed not to interact.

### COLA Impact

FSAR Section 3.3.2.3 will be revised as follows in a future revision of the COLA:

#### **3.3.2.3 Interaction of Non-Seismic Category I Structures with Seismic Category I Structures**

{Non-safety-related structures located on the site and not included in U.S. EPR FSAR Section 3.3.2.3 include:

- Fire Protection ~~Water~~ Storage Tanks
- Fire Protection Building
- ~~Warehouse Building~~
- Central Gas Supply Building
- Security Access Facility
- Switchgear Building
- 500 kV GIS Switchyard Building
- ~~Miscellaneous Structures in the Transformer and Switchyard Areas~~
- Circulating Water System Cooling Towers
- Circulating Water System Pumphouse
- BBNPP Intake Structure
- Combined Waste Water Retention Pond
- ~~Structure for~~ Demineralized Water Tanks

<sup>1</sup> If the non-safety-related structures identified below are relocated such that the distance to the closest safety-related is increased, the design methodology may be revised accordingly.

- Water Treatment Building
- Meteorological Tower
- ~~Grid Systems Control Building~~
- ~~Administrative and Maintenance Buildings~~
- Workshop & Warehouse Building
- General Warehouses (2)
- Office-Field Construction
- Potable Water Meter House
- Permanent Training and Simulation
- Bechtel Construction Office Building
- Hazardous Waste Storage Building
- Hydrogen Storage

These non-safety-related structures are miscellaneous steel and concrete structures, which, except for the Switchgear Building, are not designed for high wind and tornado loadings. However, the Fire Water Storage Tanks and the Fire Protection Building are designated as Seismic Category II-SSE structures, and are designed to remain functional during and following a design basis seismic event. These structures are located, such that their collapse from high winds or tornado loadings would not result in transfer of unanalyzed loads to any safety-related structure. During detailed design of such structures, their heights and separation distances from safety-related structures will be maintained such that the failure of these structures due to tornado loadings will not affect the ability of safety-related structures to perform their intended safety functions. Safety-related structures are designed and analyzed to withstand the effects of tornado missiles in accordance with RG 1.76.

In addition, the monorail (a non-safety-related structural component) located on top of the ESWEMS Pumphouse is designed as Seismic Category II. Its failure does not impair the design basis safety function of safety-related SSCs or create tornado generated missiles.}

The Switchgear Building has potential for interaction with safety-related structures and is designed to withstand the effects of tornado loadings. The structural system of the Switchgear Building employs engineered pressure relief siding panels to mitigate the effects of tornado loadings.}

Enclosure 2

Annotated FSAR Figure 2.1-1



Annotated FSAR Figure 2.1-1

