BellBendCOLPEm Resource

From: Canova, Michael
Sent: Monday, April 20, 2009 11:14 AM
To: Sgarro, Rocco R; BBNPP@pplweb.com; jennifer.mcqueeney@unistarnuclear.com; Katie.Thurstin@unistarnuclear.com
Cc: BellBendCOL Resource; Weisman, Robert
Subject: Bell Bend COLA - Request for Information No. 1 (RAI No. 1)- RGS2 - 1849
Attachments: Letter 1 - RAI 1849 RGS2.pdf

Attached is RAI No. 1 for the Bell Bend COL Application. per our discussion of April 17, We understand that you have no questions regarding the content of the initial draft sent to you on April 6, 2009.

You are requested to respond to this request within 30 days. response durations are factored into your review schedule. If additional time is required to respond, please inform me of your proposed schedule to respond at your earliest opportunity.

If you have any questions, please contact me.

Michael A. Canova
Project Manager - Bell Bend COL Application
Docket 52-039
EPR Project Branch
Division of New Reactor Licensing
Office of New Reactors
301-415-0737

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4/20/2009

Bell Bend
PPL Bell Bend LLC.
Docket No. 52-039
SRP Section: 02.05.01 - Basic Geologic and Seismic Information
Application Section: 2.5.1

QUESTIONS for Geosciences and Geotechnical Engineering Branch 2 (RGS2)

02.05.01-1

FSAR Section 2.5.1 provides Figure 2.5-6 as a geologic map for the 25 mile or 40 km radius of the BBNPP site. The application refers to Figure 2.5-6 many times through out the Chapter. This map is a cut-out or excerpt of a general state geologic map of Pennsylvania. In order for NRC staff to understand the presentation in the text of the regional and vicinity level discussions for geologic history, stratigraphy and structural/tectonic features as they relate to the Bell Bend site, the staff needs a map that is more detailed and has higher resolution than Figure 2.5-6. Please provide such a geologic map, with an appropriate scale, to show additional detail for the vicinity of the BBNPP site. An appropriate scale is one such that a new reader can examine the geologic map and see that the relationship that is being described in the text is in fact corroborated by the mapping.

02.05.01-2

FSAR Section 2.5.1.1.2 (starting on page 23 of BNP-2008-006 Attachment 1) provides a discussion about the regional geologic history around the BBNPP. Please provide a clear, distinct discussion of the development of the tectonic provinces of the Blue Ridge, Piedmont and Mesozoic rift basin provinces and the tectonic features within these provinces. Please discuss the terranes that occur within a 200-mile radius of the BBNPP site, including the Grenville-aged Avondale and West Chester Massifs, the Taconic and Alleghanian terranes such as the Philadelphia Structural block and associated shear zones, and the Westminster, Baltimore, and Reading Prong Provinces.

In order for NRC staff to assess the character of the regional geology and follow the discussion in the text please provide additional figures. Include a figure showing tectonostratigraphic provinces within the 200 mile radius to guide the discussion. Include figures that show details of the tectonostratigraphic provinces, at the appropriate scales, as they are discussed in text.

02.05.01-3

FSAR Section 2.5.1.1.2 (BNP-2008-006 Attachment 1 - Page 329) provides Figure 2.5-10 which is a conceptual geologic evolution of the Eastern continental margin by R. D. Hatcher. Figure 2.5-10 is not referred to in the FSAR nor are the components of the figure, the geologic evolution of the Eastern continental margin, discussed in text.

In order for NRC staff to evaluate the Regional Geologic history, please provide a discussion that is built upon such a conceptual model for the Central Appalachian Orogen with respect to the 200 mile radius of BBNPP.

02.05.01-4

FSAR Section 2.5.1.1.4 (BNP-2008-006 Attachment 1 - Page 34) provides a discussion about the Regional Tectonic Setting. Figure 2.5-15 (BNP-2008-006 Attachment 1 - Page 337) frequently referred to in that section has too many different types of features crowded together on a regional scale map and is difficult to read. In order for the NRC staff to evaluate all the tectonic features within a 200 mile radius of the BBNPP, please revise figure Figure 2.5-15 for clarity and add other figures showing more detailed scale maps to support specific discussions in the text. Specifically:

1. Separate the EPRI tectonic interpretations and illustrate them on their own maps. (EPRI tectonic interpretations are generic and not a replacement for geologic/tectonic structure maps.)

2. Provide a separate illustration of seismic source zones.

3. Provide a separate figure with all Mesozoic basins (exposed, covered, and offshore) within the regional radius and the associated faults that are known.

4. Provide a separate figure for potential field features in greater detail than shown generically in Figure 2.5-15, and include the underlying potential field data and the interpretation.

5. Indicate the age of the structures (e. g. PC, Pz, Mz, Cz) where possible.

02.05.01-5

FSAR Section 2.5.3.1.2 refers the reader to Figure 2.5-105s (page 471) for illustration of the LiDAR data used to characterize the BBNPP vicinity (25 mile radius). The applicant also stated that the aerial reconnaissance investigated geomorphology and targeted numerous previously mapped geologic features and potential seismic sources (e.g., Berwick fault, Light Street fault, and Berwick Anticlinorium). The LiDAR figure that is provided is un-useable, either using paper copy or electronic image. Features in the central portion of the figure are unreadable.

In order for NRC to evaluate the integrity of the youngest surfaces for stability or surface faulting please provide legible figures or Arc View shape files for examining the LiDAR data. Please post the local glacial feature/deposit contacts on this figure for the 5 mile radius scale as well as the trace of the Lightstreet and Berwich faults at the 25 mile radius scale.

02.05.01-6

FSAR Section 2.5.3.1.3 refers the reader to Figure 2.5-105t, which illustrates the Site Vicinity topography and the field stations pertaining to recent geologic field

reconnaissance. In order for the NRC to evaluate whether the field work performed to characterize the Bell Bend site is complete, for each station (way point 1-5) please provide what feature(s) were examined and what was found. Include any geologic structure measurements taken (strike and dip of bedding, foliation, cleavage, minor fold axes, and offsets on any feature), any fluvial deposit that could contain evidence of paleoliquefaction. Also include specific references to photographs that were taken at the stations.

02.05.01-7

FSAR Section 2.5.1.4 discusses the attitude of bedding planes in several locations in the text. The reported bedding plane attitudes are highly variable and inconsistent with a location on the northwest limb of and just off of the axis of a major, open, anticline. The staff would expect the bedding planes to be gently dipping to the NW or practically horizontal unless there is perhaps another structure, such as other folds or a hidden fault, complicating local structural elements. Please identify any such structure, if one exists. The text states:

- Page 89: The BBNPP site is situated on the northern limb of the fold, with beds that are steeply dipping.
- Page 91: The investigation at the BBNPP site indicates that the site is underlain by unfaulted Middle Devonian shale dipping 15 to 85 degrees, and covered by a layer of undeformed glacial outwash and till (Figures 2.5-96, 2.5-97, 2.5-98, 2.5-99, 2.5-100, and 2.5-100a). A note on all these figures indicates that the average bedrock orientation is a N20˚E strike with a 70˚dip to the SE.
- Page 92: The velocity model developed for the site depicts the bedrock surface to be nearly flat lying from west to east and dipping to the south.

Because there are significant fold structures in the area, it appears incorrect to apply average strike and dip. The location of the site on the northwest limb of the fold would suggest that the bedding planes dip in a NW directions rather than a SE direction. A range of dip between 15 to 85 degrees in a localized area would call for some explanation given the location in the Valley and Ridge province. Please provide any location-specific structural measurements that are available.

Although the resolution appears limited, the photo figures of rock outcrops (Figures 2.5-105q, 2.5-105p, 2.5-105n) seem to show steeply dipping, intersecting cleavage planes producing the steeply dipping fabric. The loose material at the base of the outcrops looks like classic pencil cleavage. In particular, Figure 2.5-105p, where the man is looking at the cliff, bedding planes seems to be dipping much less than 70 degrees (not to be confused with cleavage). Please explain whether cleavage and bedding have been confused and lumped together in the strike and dip measurements provided throughout the text in various locations.

In order for NRC staff to understand the character of the geologic materials in the site area and site location, please explain and clarify the information regarding the following specific structural items described in the text.

(a) Specific strike and dip of correctly and consistently identified rock fabric features, located on a map, actually define structure. The spatial distribution and values of strikes and dips can outline unrecognized folds and perhaps faults. To evaluate whether such

unrecognized folds and faults may exist, please provide a geologic map showing the locations and values of all strike-and-dip measurements in the Mahantango Formation at or near the site.

(b) Please locate the outcrops that are shown in Figures 105j (p. 462) and 105n (p. 466) on the map that is requested in part a, and show the bedding orientations, cleavage orientations, and joint orientations at these outcrops.

(c) The log of borehole 306 shows an unusually deep water table (figs. 2.5-97 and 2.5-100a, p. 443 and 447). Refraction profiles show that at seven places the bedrock surface deepens abruptly by several tens of feet (figs. 104 and 105a-f, p. 451 and 453-458). The map of the elevations of the top of bedrock shows at least two elevation anomalies that trend north to north-northeast (fig. 2.5-105, p. 452). The anomalies might represent increased permeability or increased weathering along unrecognized faults. Please show all of these anomalies on an uncolored version of figure 2.5-105, to aid NRC staff in assessing the possibility of unrecognized faults. Please design the figure so that it can be overlaid on the map requested in part a.

(d) Please modify the LiDAR topographic section DD so that the vertical scale for the zone nearest the site takes full advantage of the LiDAR data resolution. Please use a scale in 10s of feet rather than 100s of feet.