BellBendCOLPEm Resource

From: Canova, Michael
Sent: Friday, May 25, 2012 4:17 PM
To: Sgarro, Rocco R; 'BBNPP@pplweb.com'; 'melanie.Frailer@unistarnuclear.com'; Woodring, Kathryn L; Kirkwood, Jon K
Cc: BellBendCOL Resource; Segala, John; Hearn, Peter; Wheeler, Larry; McKenna, Eileen; Goldin, Laura; Jaffe, David
Subject: RE: Bell Bend COLA - Draft Request for Information No. 115 (RAI No. 115) - BPTS 6436
Attachments: DRAFT RAI Letter 115 BPTS 6436.doc

Attached is DRAFT RAI No. 115 for the Bell Bend COL Application. Please contact me at your earliest convenience to identify whether you need a clarifying conference call prior to issuance of this RAI.

During the call, a schedule for response submittal will also need to be established

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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From: Canova, Michael

Created By: Michael.Canova@nrc.gov

Recipients:
"BellBendCOL Resource" <BellBendCOL.Resource@nrc.gov>
Tracking Status: None
"Segala, John" <John.Segala@nrc.gov>
Tracking Status: None
"Hearn, Peter" <Peter.Hearn@nrc.gov>
Tracking Status: None
"Wheeler, Larry" <Larry.Wheeler@nrc.gov>
Tracking Status: None
"McKenna, Eileen" <Eileen.McKenna@nrc.gov>
Tracking Status: None
"Goldin, Laura" <Laura.Goldin@nrc.gov>
Tracking Status: None
"Jaffe, David" <David.Jaffe@nrc.gov>
Tracking Status: None
"Sgarro, Rocco R" <rrsgarro@pplweb.com>
Tracking Status: None
"'BBNPP@pplweb.com'" <BBNPP@pplweb.com>
Tracking Status: None
"'melanie.Frailer@unistarnuclear.com'" <melanie.Frailer@unistarnuclear.com>
Tracking Status: None
"Woodring, Kathryn L" <KFitzpatrick@pplweb.com>
Tracking Status: None
"Kirkwood, Jon K" <jon.kirkwood@unistarnuclear.com>
Tracking Status: None

Post Office: HQCLSTR01.nrc.gov

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5/25/2012

Bell Bend
PPL Bell Bend LLC.
Docket No. 52-039
SRP Section: 09.02.05 - Ultimate Heat Sink
Application Section: 9.2.5

QUESTIONS for Balance of Plant and Technical Specifications Branch (BPTS)

Request for Additional Information No. 6436 Revision 2

09.02.05-18

Standard Review Plan 9.2.5, “Ultimate Heat Sink”, Section II, “Acceptance Criteria,” states that relevant Commission regulations related to the UHS are GDC 2, 4, 5, 44, 45 and 46. The Commission regulations should also apply to the emergency makeup water system (ESWEMS), which is an extension of the UHS heat sink and cooling towers. BBNPP FSAR Section 9.2.5 does not specifically state whether the Commission regulations (GDC 2, 4, 5, 44, 45 and 46) have been evaluated for the ESWEMS. Specifically, the applicant should add this information to the BBNPP FSAR.

09.02.05-19

The staff determined that BBNPP FSAR Section 9.2.5 was missing information related to RG 1.27, “Ultimate Heat Sink”.
U.S. EPR FSAR Section 9.2.5.3.1, “Mechanical Draft Cooling Towers,” states that the division four cooling tower shares use with the dedicated ESW train and can transfer severe accident (SA) heat loads to the environment under worst-case ambient conditions.
For the BBNPP FSAR Section 9.2.5, the staff was unable to find any discussion or reference to the dedicated ESW train for severe accidents.
Specifically, the applicant should add this information to the BBNPP FSAR related to severe accident; that the emergency makeup water system (ESWEMS) provides water makeup to the UHS, division four.

09.02.05-20

The staff determines that BBNPP FSAR Section 9.2.5 was missing information related to GDC Criterion 44, “Cooling Water” and RG 1.27. BBNPP FSAR Section 9.2.5.3.2 describes the emergency makeup water system (ESWEMS) pumphouse bar screens; however, the staff was unable to locate the bar screens on any FSAR drawings in order to complete its review.
Specifically, the applicant should add this information to the BBNPP FSAR Figures.

09.02.05-21

Follow-up to RAI Letter # 84 (3990) Question 09.02.05-4 part 12.
Bell Bend FSAR Figure 9.2-3 indicates that the ESWEMS auto strainer debris flush lines and the ESWEMS recirculation return lines are non-safety-related Seismic Category II. However, the description in Bell Bend FSAR Section 9.2.5 does not justify the conclusion that these functions are not necessary to ensure the long-term operability of the cooling towers (in which case, they would have to be designated as safety-related, Seismic Category I).
The staff reviewed the applicant's response to RAI Letter # 84 (3990) Question 09.02.05-4 part 12 and found it unacceptable. Since both the strainer blowdown line and recirculation line which discharge to the pond are needed for operability of the ESWESM and an open flow path to the pond should be maintained, the non-safety, non-seismic classification is unacceptable since the nonsafety-related line could become blocked or the pipe could be crimped from a missile.
Specifically the applicant should address the following in the FSAR:
Provide assurance that there is an open flow path for the ESWEMS strainer blowdown line and recirculation line during a DBA and 30 days post DBA which discharges to the pond.

09.02.05-22

The staff determines that BBNPP FSAR Section 9.2.5 was missing information related to GDC Criterion 44, "Cooling Water" and RG 1.27. The staff reviewed the applicant's' response related to heat tracing for ESWEMS in RAI Letter # 84 (RAI 3990) Question 09.02.05-7 and found that the additional information was needed.
Specifically, described in the BBNPP FSAR;

- The safety classification and seismic classification of the heat tracing associated with the ESWEMS.
- The associated main control room alarms associated with low temperature conditions of the ESWEMS piping system or loss of heat tracing.

09.02.05-23

Follow-up to RAI Letter # 84 (3990) Question 09.02.05-6
The staff found that the a detailed NPSH discussion was not added by the applicant's response in FSAR Section 9.2.5 for NPSH requirements for the emergency makeup water pumps for the ESWEMS pumps.
Specifically, the applicant should address in the COL FSAR:

- Given the decreasing water levels in the ESWEMS retention pond and at the maximum design cooling water temperature for the duration of a 30 day accident, describe the ESWEMS pump NPSH available versus the NPSH required before makeup is available at the end of the 30 days.
- Given the decreasing water levels in the ESWEMS retention pond for the duration of a 30 day accident, describe if vortex formation related to the pumps has any negative consequences before makeup is available at the end of the 30 days of the DBA.

09.02.05-24

The staff determines that BBNPP FSAR Section 9.2.5 was missing information related to GDC Criterion 44, “Cooling Water” and RG 1.27.
BBNPP FSAR Section 9.2.1.3.5, “Piping, Valves, and Fittings,” state that the ESWS piping, valves and fittings are made of carbon steel. This is compatible with the water chemistry in the ESWS tower basin. Buried piping is coated and wrapped and provided with appropriate cathodic protection. The Cathodic Protection (CP) system for underground pipe is described in Section 8.3.1.1.15.
BBNPP FSAR Section 9.2.5 does not specifically describe if the emergency makeup water system (ESWEMS) is buried and has cathodic protection.
Specifically, the applicant should add this information to the BBNPP FSAR related to Section 9.2.5 related to any site specific buried UHS support piping which should be cathodic protected.

09.02.05-25

10 CFR Part 50, Appendix A, GDC 2, “Design Bases for Protection Against Natural Phenomena,” states that structures, systems, and components (SSCs) important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions.

Regulatory Guide (RG) 1.27, “Ultimate Heat Sink for Nuclear Power Plants,” states that the sink safety functions may be provided by natural or manmade features. More than one water source may be involved in the sink complex in performing these functions under different conditions. Because of the importance of the sink to safety, these functions should be ensured during and following the most severe natural phenomena postulated for the site (e.g., the Safe Shutdown Earthquake, design basis tornado, hurricane, flood, or drought).

COL FSAR Subsection 9.2.5.3.2 states that the Essential Service Water Emergency Makeup System (ESWEMS) consists of a retention pond, 700 ft x 400 ft. Approximately 76.6 acre-ft of water is maintained below the normal operational water level of 17 ft (5 m), elevation 695 ft (212 m) NAVD 88. The minimum required level 12 ft (4 m), elevation 689.5 ft (210.2 m) NAVD 88, maintains a volume of approximately 50.3 acre-ft. The ESWEMS Retention Pond was sized for the design basis LOCA in accordance with NRC RG 1.27 (NRC, 1976) assuming the ESWEMS does not start up until 72 hours post-accident with two Emergency Service Water System trains running.

The total inventory loss from the ESWEMS retention pond during the 30 day period under the most limiting meteorological conditions (maximum evaporation conditions) was conservatively calculated to be 46.4 acre-ft. The worst case environmental conditions are based on 30 years of historical meteorological data for the area as required by RG 1.27. The day of lowest average relative humidity is combined with the highest average monthly insolation and the 1% exceedance extreme annual wind speed to create a synthetic day for single day worst-case pond evaporation. This synthetic day is then repeated for 30 consecutive days to create a conservative 30-day period. This inventory loss consists of the following calculated losses and design allowances: (1) 34.2 acre-ft for cooling tower evaporation; (2) 9.8 acre-ft for loss to an ice cover; (3) 2.4 acre-ft for

pond seepage. The total water remaining after 30 days is 3.9 acre-ft. All of the remaining water is usable, which provides a margin greater than 8% of the total volume requirement.
COL FSAR Subsection 2.3.1.2.2.1 states that in the period from January 1, 1950, through August 31, 2007 (NOAA, 2008d), eight tornadoes were reported in Columbia County, Pennsylvania. as presented in COL FSAR Table 2.3-3. This corresponds to an annual average of about 0.14 tornadoes per year. The magnitude of the tornadoes ranged from F0 to F2, as designated by the National Weather Service. The width of the paths of the eight tornadoes in Columbia County was estimated to range from 10 to 75 yards (9 to 69 m).

COL FSAR Subsection 2.3.1.2.2.14 states that using the methodology and values in Table 1 from RG 1.76 (NRC, 2007b), the design-basis tornado characteristics for BBNPP are presented in Table 2.3-20. The maximum tornado wind speed is 230 mph (103 mps), the pressure drop is 1.2 psi (83 mb), and the rate of pressure drop is 0.5 psi/s (37 mb/s).

COL FSAR Subsection 2.4.8.1 states that the ESWEMS Retention Pond design must ensure that the capability to perform their safety-related function is maintained during the most severe credible natural phenomena in combination with normal operations, anticipated operational occurrences, or accident condition.

Nuclear plants that have been directly affected by tornadoes include Davis-Besse, June 24, 1998; Surry, April 16, 2011 (event number 46761); and Browns Ferry, April 27, 2011, (event number 46793). The tornado events at Surry and Davis-Besse were associated with direct hits in the switchyards.

As such, the applicant should address the following items in the COL FSAR related to tornadoes and their potential negative effects on the UHS design and operation (or, if appropriate, explain why such consideration is not relevant):

1. Describe whether a tornado direct hit of the ESWEMS retention pond was considered in terms of the amount of water inventory (margin) that may be lost and describe if a 30-day water supply remains to support post accident UHS. The Staff notes that such consideration appears to have been given in Subsection 9.2.7.3 of the Updated Final Safety Analysis Report for the adjacent Susquehanna Steam Electric Station.

2. Describe whether a tornado direct hit of the ESWEMS retention pond could cause any negative effects on running the ESWEMS pumps (such as loss of net positive suction head or pump vortexing) or other SSCs important to safety.

09.02.05-26

RG. 1.27, “Ultimate Heat Sink for Nuclear Power Plants”, states that the ultimate heat sink, as a complex, should be shown to be highly reliable by showing that certain conditions are satisfied. Such conditions would include: (1) the river cannot be diverted or blocked sufficiently to affect the availability of water at the connecting conduits; (2) no serious transportation accidents have occurred or can be reasonably expected; and (3) the dam was designed to appropriately conservative requirements, has functioned

properly over its lifetime, and (based on projection of the best available data) will function properly for the lifetime of the nuclear power units it serves.
Based on the staff's review of various site plans, for example Figures 1.1-2 and 2.4.5, it appears the Essential Service Water Emergency Makeup System (ESWEMS) maybe adjacent to service roads.

Describe in the COL FSAR the necessary controls or design features that are in place to ensure the UHS and ESWEMS remains reliable for up to 30 days post design basis accident. The concern is the UHS becoming contaminated by a transportation accident (for example trucks transporting chemicals, oils, or diesel fuel oils (etc.) into the site via access roads) and the UHS becoming unavailable to satisfy the guidance in RG. 1.27.

09.02.05-27

The staff reviewed RAI Letter 84 (RAI 3990) Question 09.02.05-5 part 2 response related to the chemical treatment and water quality related to the Essential Service Water Emergency Makeup System (ESWEMS) and finds that the applicant did not adequately describe the post accident chemical treatment philosophy because no description was added to the BBNPP FSAR.
Specifically, the applicant should address in the FSAR:

- Details of the post-accident chemical addition to the ESWEMS.
- Details of the post-accident chemical addition to the ESWEMS related to GDC 2 and negative effects on SSCs important to safety.

09.02.05-28

Follow-up to RAI Letter # 84 (3990) Question 09.02.05-4 part 7.

The staff's evaluation of the applicant's response and FSAR markup related to blowndown determined that clarification is needed related to the new drawings provided as FSAR markup shown on Figure 9.2-12, "EWS Blowdown Line."

Specially, the applicant should address the following in the FSAR:

- Safety-related to nonsafety-related boundaries should be added to Figure 9.2-12 clearly identifying the site specific design and certified design boundaries.

- Normal ESW strainer debris removal pipe appears to be missing from Figure 9.2-12.

09.02.05-29

The staff determines that BBNPP FSAR Section 9.2.5 was missing information related to GDC Criterion 44, "Cooling Water" and RG 1.27. The applicant has not completed various items which are listed below.

Specifically the applicant should complete these items and provide FSAR markups as required:

1. (TBD) - Site-specific chemistry comparison for normal and emergency makeup water.}
2. (TBD) – U.S. EPR FSAR Table 9.2.5-2, 0% exceedance value confirmed UHS coldwater return temperature maximum of 95°F not exceeded.
3. (TBD) - Cooling tower interference on safety-related intakes.
4. (TBD) - U.S. EPR FSAR Table 9.2.5-3 values bounded for 72 hour period evaporative and drift losses.
5. (TBD) – U.S. EPR FSAR Table 9.2.5-4 values bounded for 24 hour period for 95°F UHS cold-water return temperature.
6. (TBD) – UHS Makeup capacity sufficient for maximum evaporative and drift water losses 72 hours through 30 days.

09.02.05-30

Follow-up to RAI Letter # 84 (RAI 3990) Question 09.02.05-2 (part 3).

The applicant responded to RAI Letter # 84 on May 3, 2010 stating that the two non safety-related instruments on Figure 9.2-3 are correctly classified as nonsafety-related. BBNPP FSAR Table 3.2-1 will be revised to clarify the safety-related ESWEMS instruments and controls and add non safety-related instruments and controls as shown below.

The staff notes that this response is that the ESWEMS retention pond water level and water temperature instrumentation are nonsafety-related. However, Technical Specifications (TS) 3.7.19 states that the ESWEMS retention pond water level and water temperature have surveillance requirements (SR). It is unclear if the nonsafety related instruments are to be utilized to completed these SR.

Specifically the applicant should address in the FSAR:

- Describe the instruments to be utilized for TS SR 3.7.19.7, verification of the water temperature in the ESWEMS retention pond.
- Describe the instruments to be utilized for TS SR 3.7.19.8, verification of the water level in the ESWEMS retention pond.
- Describe if nonsafety related instruments can be utilized to perform these two TS SR stated above. Typically, nonsafety related instruments do not meet stringent criterion (calibrated to Bureau of National Standards (BNS)) and cannot be used or credited for the completion of TS SRs.

09.02.05-31

The staff determines that BBNPP FSAR Section 9.2.5 was missing information related to GDC Criterion 44, “Cooling Water” and RG 1.27.

FSAR Section 9.2.5.4.2, “Abnormal Operating Conditions,” does not have any detailed description related to the normal or abnormal conditions power conditions, for example response to loss of off-site power (LOOP), and power supplies to components important to safety.

09.02.05-32

The staff found that the ITAAC information is incomplete, inconsistent, inaccurate, or that clarification is needed. The missing information is needed for compliance with 10 CFR 52.80 (a).

Describe the following items in the BBNPP application, Part 10 - ITAAC:

1. EPR FSAR, Tier 1, Section 2.7.11, Item 8.2 states that the site-specific emergency makeup water system provides water to each ESW cooling tower basin at a temperature below the maximum ESWS supply temperature of 95 °F (35 °C).
2. EPR FSAR, Tier 1, Section 2.7.11, Item 8.4 states that the site-specific emergency makeup water system provides a means to limit corrosion, scaling, and biological contaminants in order to minimize component fouling for a minimum of 30 days post-DBA.

09.02.05-33

The staff found that the ITAAC information is incomplete, inconsistent, inaccurate, or that clarification is needed. The missing information is needed for compliance with 10 CFR 52.80 (a).
Specially, the applicant should address the following in the FSAR:

- Table 2.4-19 does not specifically state that displays and controls are present in the main control room and remote shutdown panel.
- Table 2.4-19, ITAAC #18 does not specially state the NPSH is at the lowest retention pool water level, post 30 days after the accident.

09.02.05-34

Means must be provided for monitoring effluent discharge paths and the plant environs for radioactivity that may be released in accordance with GDC 64 requirements. Also, 10 CFR 52.79(a)(45) and 10 CFR 20.1406 require COL applicants to describe the facility design and procedures for operation that will minimize contamination of the facility and the environment.

According to Standard Review Plan (SRP) Section 9.2.1, the staff must verify that provisions are provided to detect and control leakage of radioactive contamination into and out of the ESWS, which is part of the UHS and the UHS blowdown. The UHS blowdown is a release point to the environment from the ESWS/UHS. The design is considered to be acceptable by the staff if the UHS/ESWS drawings show that radiation monitors are provided for components that are susceptible to leakage, and if the components that are susceptible to leakage can be isolated. However, the staff noted that FSAR Section 9.2.5 does not include radiation monitors in the system design and the NRC regulations in this regard have not been addressed. Therefore, additional information needs to be included in Tier 2 FSAR Section 9.2.5 to address this issue.