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February 7, 2013

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC20555-0001

BELL BEND NUCLEAR POWER PLANT
RESPONSE TO RAI NO. 115
QUESTIONS 09.02.05-27, 09.02.05-29 and 09.02.05-32
BNP-2013-020 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. 115 (RAI No. 115) – BPTS 6436, email dated June 11, 2012

2) BNP-2012-184, R. R. Sgarro (PPL Bell Bend, LLC) to U.S. NRC, "Response to RAI No. 115 Questions 09.02.05-28 and 09.02.05-34 and Schedule Information," dated July 30, 2012

3) BNP-2012-206, R. R. Sgarro (PPL Bell Bend, LLC) to U.S. NRC, "Schedule Information for RAI No. 115 Question 09.02.05-27," dated August 30, 2012

4) BNP-2012-256, R. R. Sgarro (PPL Bell Bend, LLC) to U.S. NRC, "Response to RAI No. 115 Questions 09.02.05-32 and 09.02.05-33," dated October 12, 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. 115, Questions 09.02.05-29-part 1 on or before February 15, 2013. In Reference 3, PPL Bell Bend, LLC (PPL) indicated that PPL would provide a response to RAI No. 115, Questions 09.02.05-27 on or before February 8, 2013. In Reference 4, PPL Bell Bend, LLC (PPL) indicated that PPL would provide a response to RAI No. 115, Questions 09.02.05-32 –part 2 on or before February 8, 2013. This RAI addresses the Ultimate Heat Sink as discussed in Section 9.2.5 of the Final Safety Analysis Report (FSAR), as submitted in Part 2 of the Bell Bend Nuclear Power Plant (BBNPP) Combined License Application (COLA).

The Enclosure provides our responses to RAI No. 115 Questions 09.02.05-29-part 1, 09.02.05-27, and 09.02.05-32-part 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.

D102
NRD

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 February 7, 2013.

Respectfully,

Rocco R. Sgarro

RRS/kw

Enclosure: As stated

cc: (w/ Enclosure)

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(w/o Enclosure)

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Enclosure

Response to RAI No. 115,
Questions 09.02.05-27, 09.02.05-29-part 1, and 09.02.05-32-part 2

RAI No. 115
Question 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.

Reference: Calvert Cliffs Unit 3 RAI 279, Question 09.02.05-7

Response
The water chemistry control for the Essential Service Water System (ESWS) during normal operation and the water quality of the ESWS tower basin just prior to a design basis accident (DBA) was addressed in the response[1] to Bell Bend RAI Requests for Additional Information (RAI) No. 84, Question 09.02.05-4. In order to verify that the water chemistry of the Essential Service Water Makeup System (ESWEMS) Retention Pond will not adversely affect the ESWS, the chemistry conditions were analyzed for a period of 30 days following a Design Basis Accident (DBA). Conservatively, it is assumed that there is no chemical treatment of the ESWEMS pond following the DBA and that no blowdown from the ESWS cooling tower basin occurs.

The initial water chemistry of the ESWS Ultimate Heat Sink (UHS) Cooling Tower Basin prior to a DBA represents the normal operating chemistry of the system, and is bounded by the values listed in U.S. EPR FSAR Table 9.2.5-5 as described in the response[1] to Bell Bend RAI No. 84, Question 09.02.05-4. The ESWS is designed to operate with three factors of concentration over the Susquehanna River composition. Sulfuric acid additions are utilized to control the UHS Cooling Tower Basin pH and total alkalinity within the specifications in the U.S. EPR FSAR Tier 2, Table 9.2.5-5.

The calcium hardness is of most concern regarding the impact of water chemistry on the ESWS ability to dissipate DBA heat loads. Based on the Susquehanna River chemistry, the makeup water to the ESWS UHS Cooling Tower Basin during normal operation and makeup to the ESWEMS Retention Pond will contain less than 5 mg/L silica. This silica level will allow for many cycles of concentration without risk of magnesium silicate precipitation. Therefore, the post-DBA chemistry evaluation considered those factors influencing calcium carbonate scale, including Total Dissolved Solids (TDS), calcium hardness, and total hardness. Total Suspended Solids (TSS) were also determined, although most TSS introduced into the system would be expected to settle in the basin and not adversely affect heat transfer.

As part of the post-DBA chemistry evaluation, the chemical condition of the limiting ESWS UHS Cooling Tower Basin was determined at the end of the 72-hour isolation period just prior to ESWEMS actuation. Using the normal operation chemistry and the basin water loss during the first 72-hous, a total contaminant concentration was determined. The water chemistry

[1] BNP-2012-088, Rocco R. Sgarro (PPL Bell Bend, LLC) to Document Control Desk (NRC), "Response to Requests for Additional Information No. 84," dated March 30, 2012.
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conditions of the ESWS cooling tower basin were quantified under a design basis heat load for 30 days, in accordance with RG 1.27, assuming no makeup in the first 72 hours.

To determine the effect of the ESWEMS Retention Pond chemistry on the ESWS cooling tower basin, the likely chemical composition of the ESWEMS Retention Pond was determined based on the site meteorological data and pond design criteria. Since the ESWEMS Retention Pond will receive little or no runoff from rainfall (i.e., it only receives what falls directly on the pond area of approximately 6.5 acres), the ESWEMS Retention Pond makeup water is mostly Susquehanna River water. Using the balance of pond evaporation, pond seepage, and makeup from the river, the expected composition of the ESWEMS Retention Pond water was determined. In order to provide a reasonable value for the water chemistry, which would equilibrate over a long time period, the mean values for the Susquehanna River (source of water for the ESWEMS Retention Pond), were used to determine the ESWEMS pond water composition.

Once ESWEMS actuates, the UHS Cooling Tower Basin is assumed to begin re-filling at 300 gpm until the Technical Specification minimum level is reached. Due to continued evaporation from the cooling towers, the basin requires approximately two weeks to re-fill. During the ESWEMS mission time, the concentration of chemical contaminants in the basin continues to increase. For conservatism, blowdown, basin seepage, and droplet drift from the cooling towers are not included in the calculation, since all of these terms would remove contaminants. In addition, all of the heat dissipation from the UHS Cooling Tower was assumed to come from evaporation, which maximizes the ESWEMS water addition and maximizes the contaminant concentration in the basin at the end of 30 days.

The results of this evaluation for the UHS Cooling Tower Basin chemistry are shown in the below table for the three (3) to thirty (30) day post-DBA period. The procurement specifications for the ESWS equipment will specify that the components are to perform their safety related function given the chemistry conditions indicated in the table. Using this water chemistry will provide assurance that the ESWS system components can perform their design function during a 30 day period without chemical treatment. Therefore, no additional post-accident chemical treatment is required.

Consequently, BBNPP COLA FSAR Figure 9.2-14 will be revised to remove the ESWEMS Retention Pond site-specific chemical treatment system. Additionally, FSAR Table 14.3-3 will be revised to indicate an ITAAC is not required since post-accident chemical treatment is not required. This response supersedes the information regarding post-accident chemical treatment system provided in the last paragraph of the PPL response[1] to Bell Bend RAI No. 84 Question 09.02.05-5 part 2.

[1] BNP-2012-088, Rocco R. Sgarro (PPL Bell Bend, LLC) to Document Control Desk (NRC), "Response to Requests for Additional Information No. 84," dated March 30, 2012.

Worst Case ESWS UHS Basin Chemistry following a Design Basis Accident

Time (hours)	TDS (mg/L)	TSS (mg/L)	Calcium Hardness (mg/L as $CaCO_3$)	Total Hardness (mg/L as $CaCO_3$)	Total Scale (kg as $CaCO_3$)
72.0	1,226	190	601	819	1,770
111.1	1,284	209	624	853	2,080
166.7	1,318	225	636	870	2,495
222.2	1,323	234	635	870	2,891
277.8	1,316	238	629	863	3,276
416.7	1,393	261	662	909	4,250
555.6	1,635	312	774	1,064	5,266
720.0	1,916	372	905	1,244	6,452

COLA Impact

BBNPP COLA FSAR Section 9.2.5.2.4, Figure 9.2-14 and Table 14.3-3 will be revised in a future revision of the COLA as shown below:

9.2.5.2.4 ESWS Makeup Water Chemical Treatment

.....

All components of the RWSS chemical treatment system are constructed of materials compatible with the chemicals utilized in the treatment system.

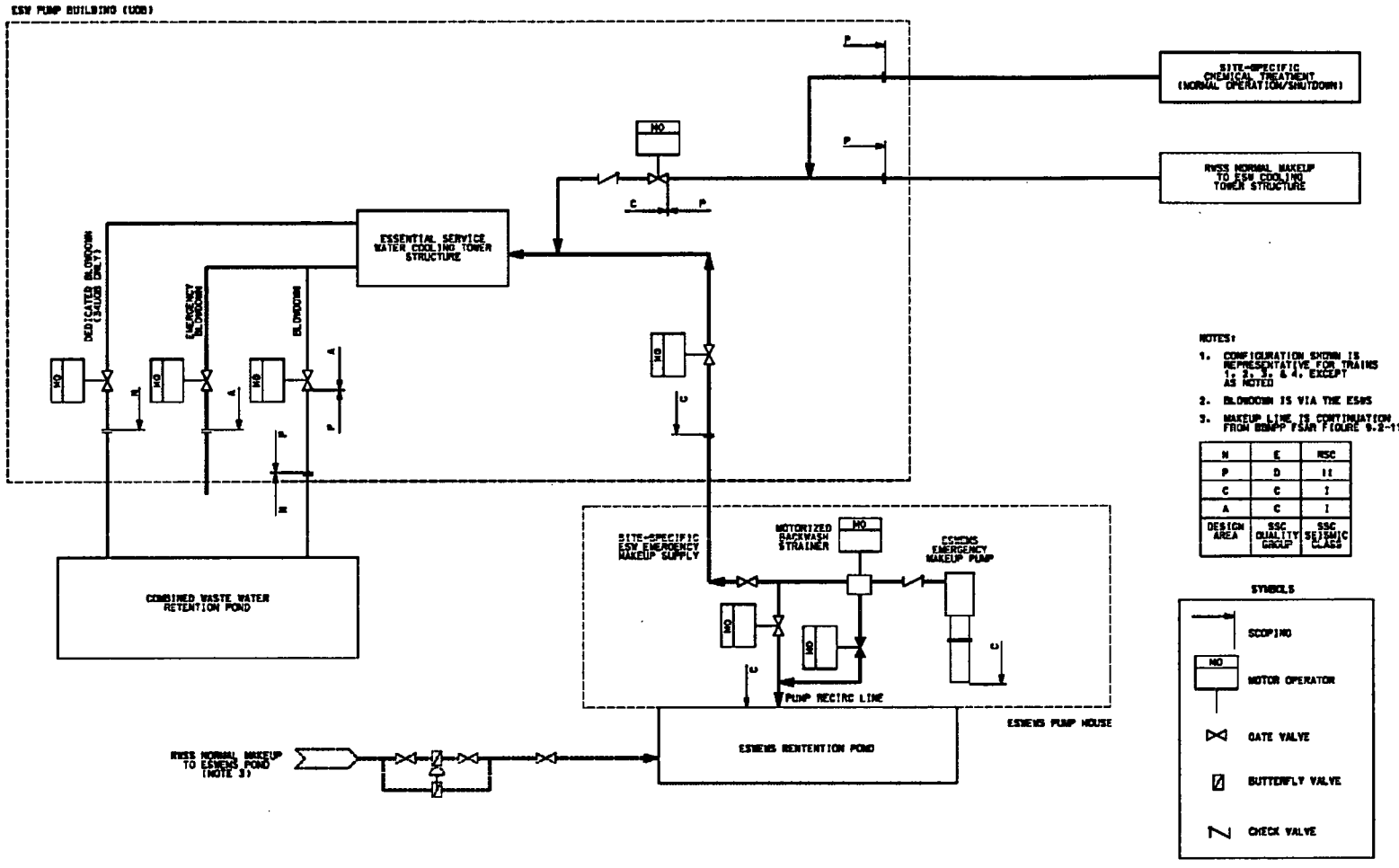
~~(TBD) - Site-specific chemistry comparison for normal and emergency makeup water.}~~

An evaluation was performed to determine the ESWS UHS Cooling Tower Basin chemistry assuming no chemical addition treatment and utilizing untreated ESWEMS Retention Pond water as makeup post-DBA for the time period of three (3) to thirty (30) days. It was determined that using this water chemistry as the basis for the design of the ESWS system provides assurance the ESWS system components can perform their design function during the 30 day post-DBA period without chemical treatment.}

Table 14.3-3— {Interface Requirements Screening Summary}

U.S. EPR FSAR Tier 1 Section #	Interface Requirement	Selected for ITAAC
.....	....	...
4.7 and 2.7.11	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.	No. ~~This item is identified as a License Condition to be evaluated with the finalization of the system design.~~ See Section 9.2.5.2.4, no chemical treatment of the ESWEMS is required following a Design Basis Accident.

Figure 9.2-14— {Ultimate Heat Sink Systems}



Question 09.02.05-29 Part-1

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.}

Response

The Bell Bend site-specific chemistry comparison for the normal makeup water system was presented in the response[1] to Bell Bend Requests for Additional Information (RAI) No. 84, Question 09.02.05-4.

The Bell Bend site-specific chemistry comparison for the emergency makeup system is addressed by the response to RAI 115, Question 09.02.05-27 contained in this enclosure.

COLA Impact

The BBNPP COLA will be revised as shown in the response to RAI 115, Question 09.02.05-27 contained in this enclosure.

[1] BNP-2012-088, Rocco R. Sgarro (PPL Bell Bend, LLC) to Document Control Desk (NRC), "Response to Requests for Additional Information No. 84," dated March 30, 2012.

Question 09.02.05-32 Part-2

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:

.....

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.

Response

BBNPP does not require an ESWEMS post-DBA chemical treatment system as stated in the response to RAI 115, Question 09.02.05-27 contained in this enclosure. Based on an ESWEMS post-DBA chemical treatment system not being required, FSAR Table 14.3-3 will be revised to indicate an ITAAC for the U.S. EPR Tier 1, Section 2.7.11, Item 8.4 is not required.

COLA Impact

The BBNPP FSAR Table 14.3-3 will be revised as shown in the response to RAI 115, Question 09.02.05-27 contained in this enclosure.