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October 4, 2011

Mr. Andrew D. Dehoff
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BELL BEND NUCLEAR POWER PLANT
APPLICATION FOR SURFACE WATER WITHDRAWAL AND
APPLICATION FOR CONSUMPTIVE WATER USE (BNP-2011-005)
RESPONSE TO SRBC COMMENTS
BNP-2011-189 **Docket No. 52-039**

References: 1) T. L. Harpster, PPL Bell Bend, LLC., to James Richenderfer, Susquehanna River Basin Commission, BNP-2011-005, dated January 14, 2011.

2) Andrew D. Dehoff, Susquehanna River Basin Commission, to T. L. Harpster, PPL Bell Bend, LLC., "Application for Surface Water Withdrawal and Application for Consumptive Water Use – BNP-2011-005", dated August 16, 2011.

Enclosed, please find the PPL Bell Bend, LLC. (PPL) response to the Commission's August 16, 2011 letter (Reference 2). No changes have been made to our request (Reference 1) of January 14, 2011 as a result of these comments. However, in the enclosed response, we have clarified numerical calculations and provided additional system descriptions as requested. We are available for a meeting or phone call to provide further clarification as needed.

Should you have further questions or require any additional information on this matter please contact Gary Petrewski at 610-774-5996 or via e-mail at gpetrewski@pplweb.com.

Respectfully,

Terry L Harpster

TLH/kw

Enclosure: PPL Response to SRBC Letter Comments dated August 16, 2011 on PPL Bell Bend Nuclear Power Plant: Application for Surface Water Withdrawal, and Application for Consumptive Water Use

cc: (w/ Enclosure)

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Enclosure

PPL Response to SRBC Letter Comments dated August 16, 2011 on PPL Bell Bend Nuclear Power Plant: Application for Surface Water Withdrawal, and Application for Consumptive Water Use

PPL Response to SRBC Letter Comments dated August 16, 2011 on PPL Bell Bend Nuclear Power Plant: Application for Surface Water Withdrawal, and Application for Consumptive Water Use

SRBC Comment No. 1.

The fourth paragraph of the referenced correspondence states that "there are no certified cooling tower or pump performance curves" because the design and procurement has not been finalized. The proposed method of determining surface water withdrawal is based on pump capacity. The Commission requires performance curves prior to final approval of the surface water withdrawal application.

PPL Response:

It is not correct that PPL's proposed method of determining surface water withdrawal is based on pump capacity as stated in this comment. The actual rate of water withdrawal will be based on metered amounts, not performance curves. The requested peak day water withdrawal is 42 mgd which allows for the estimated peak day calculated water use of 37.5 mgd (See Section 4.1 of Enclosure 1 of the January 14, 2011 PPL letter), plus a contingency to allow for metering error, and the fact that calculated water use has been based on preliminary cooling tower performance curves. Although certified cooling tower curves are not available, the information supplied by cooling tower vendors is based on actual towers that are in operation, and believed to be accurate. PPL has also separately filed with the Commission a proposed metering plan.

The 42 mgd value also corresponds to the planned maximum project instantaneous pump capability as determined in Section 4.4 of Enclosure 1. This value is based upon the combined individual ratings of two Circulating Water System Makeup Water System (CWSMWS) pumps and one Raw Water Supply System (RWSS) pump. This value is very conservative because there is no operating scenario where more pumps would be operating simultaneously or where pump capacities would continue for an entire day. Furthermore, due to system hydraulics, the CWSMWS flow with two pumps operating in parallel will be less than the sum of the individual rated flows of the two pumps.

The final pump selection and design will optimize pump performance and efficiency to operate close to the expected pump flow and pressure requirements. The final pump performance curves will confirm that the 42 mgd withdrawal value will not be exceeded at any time. Plant procedural control including gagging of valves if necessary will assure that the surface water withdrawal value of 42 mgd is not exceeded. Metering will also be installed to ensure that the permitted withdrawal rate will not be exceeded.

PPL is comfortable in making the application for surface water withdrawal and consumptive water use based on available information. When the final design is completed, the requested values will be confirmed and cooling tower and pump performance curves will be provided to the SRBC. However, final design information will not be available prior to the expected date of Commission action on the subject applications. This information will not be available until procurement contracts are let and specific vendor performance data is provided. This will not occur until after the initiation of project construction. This is not an unusual circumstance. The Commission has previously acted, and routinely acts, without the availability of final design information.

SRBC Comment No. 2.

In Section 4, the last paragraph on page 5, the blowdown methodology for the Circulating Water System Makeup Water System (CWSMWS) is described. At the Mussel Expert Panel meeting on February 23, 2011, the blowdown operating procedure for Susquehanna Steam Electric Station (SSES) was described differently. At SSES, the CWSMWS operates at capacity and the blowdown is the difference between the quantity pumped from the river and the quantity lost to evaporation and drift in the cooling towers, and the blowdown is controlled by maintaining a certain level in the cooling tower basin. The Commission requires a description of the operational parameters that determine the quantity of blowdown at BBNPP.

PPL Response:

The operation of the BBNPP cooling towers is different from what is described in the SRBC comment. The cooling tower losses (evaporation and drift) are based on environmental conditions. The blowdown is an operator controlled value based on input from the Chemistry Department. The Chemistry Department will sample cooling tower basin water for Total Dissolved Solids and Total Suspended Solids and will provide to plant operation the cycles of concentration to be maintained in the cooling tower basin water. The operator will manually adjust the blowdown flow to maintain the cycles of concentration. The CWSMWS supplies water to the cooling tower basin to maintain a normal level in making up for the cooling tower losses and blowdown flow. A level control valve automatically adjusts CWSMWS flow to maintain the set cooling tower basin level. The CWSMWS pump flows are NOT constant. The CWSMWS pumps operate along the respective pump flow/pressure curves to adjust the flow in maintaining a constant cooling tower basin level.

As an example, if environmental conditions change such that evaporation decreases, then the basin level control valve will close slightly to account for the smaller loss and to maintain the constant cooling tower basin level. The CWSMWS pumps will operate back on their pump/flow curves to deliver lower flow. With less cooling tower evaporation over time, then the operator can decrease blowdown flow with input from the Chemistry Department to maintain the given cycles of concentration and the basin level control valve will close more to maintain the set basin level. Again, the CWSMWS pumps will operate back on their pump/flow curves to deliver lower flow.

SRBC Comment No. 3.

The Commission agrees that the surface water withdrawal quantity to be used in the application should be the "maximum instantaneous surface water withdrawal" as stated in the last paragraph of Section 4.4. The withdrawal is based on the capacity of two CWSMWS pumps and one Raw Water Supply System (RWSS) pump which is 29,100 gallons per minute (gpm).

PPL Response:

PPL is requesting a peak day water withdrawal limit of 42 mgd as discussed in response to Comment 1 above. This value happens to correspond to the project's planned pump capability. However, PPL is not proposing that Commission action include an instantaneous limit.

SRBC Comment No. 4.

The maximum instantaneous surface water withdrawal is determined by the capacity of two of three CWSMWS pumps and one of three RWSS pumps. These systems have the capacity to pump more than the requested withdrawal. The Commission requires a description of the control mechanism and/or administrative procedures to prevent more than two CWSMWS pumps and one RWSS pump from operating to assure that the requested withdrawal is not exceeded.

PPL Response:

PPL has separately filed with the Commission a proposed metering plan to ensure compliance with expected regulatory limits. Plant procedural controls will also prevent more than two CWSMWS pumps from operating at the same time and will limit only one RWSS pump to operate with two CWSMWS pumps operating near capacity. The one exception for this is when pumps are rotated in and out of service. To rotate pumps in and out of service, the operator will start a standby pump, watch for that pump's pressure and flow to come up and then trip the third pump. This is a brief period of time (seconds) and system flow will not vary to any significant extent. Operating three CWSCMS pumps or two RWSS pumps in parallel during rotation will have a negligible impact on water withdrawal flow during any hour, much less over the period of a day.

In addition, as stated in the PPL response to SRBC Comment No. 1 above, plant procedural control, including gagging of valves if necessary, will assure that the surface water withdrawal value of 42 mgd is not exceeded.

SRBC Comment No. 5.

Attachment A to Enclosure 1, "BBNPP Peak Day Water Use Diagram," does not accurately portray peak flows. For example, the diagram shows the withdrawal for the Circulating Water Supply system to be 25,085 gpm and Section 4.4 indicates the withdrawal to be 26,200 gpm. Similarly, the diagram shows the withdrawal for the Raw Water Supply System to be 952 gpm and Section 4.4 indicates that the withdrawal be 2,900 gpm. The Commission requires that Attachment A be revised showing water use at the peak water withdrawal requested in Section 4.4 of 29,100 gpm. Additionally, the Commission requires a description of plant operations at peak water withdrawal, including how often the peak withdrawal operating condition will occur.

PPL Response:

"BBNPP Peak Day Water Use Diagram" (Attachment A) already provides the expected flows for the peak day where surface water withdrawal and consumptive use is greatest. However, the

diagram does not include contingency amounts associated with potential metering error. The peak day shown in the diagram represents the worst-case meteorological conditions determined from 61 years of daily data and maximum blowdown flow. The peak day surface water withdrawal and consumptive use values of the peak day are a rare occurrence, and will only occur when the plant is operating at full load and when "worst-case" meteorological conditions are occurring. The maximum (peak day) surface water withdrawal is 26,037 gpm from Enclosure 1, Section 4.1.1 of the referenced correspondence. This amount is the total of the CWSMWS withdrawal (25,085 gpm) and the RWSS (which includes the ESWS towers and miscellaneous uses) withdrawal (952 gpm). As discussed in Attachment B the maximum evaporation rates for the ESWS towers do not occur at the same relative humidity and wet bulb temperature as the circulating water system towers. The calculation of maximum peak day withdrawal as shown in the Attachment A diagram is shown in Section 4.1.2 of Enclosure 1, and equals the maximum calculated peak day withdrawal of 37.5 MGD. PPL does not believe that it is practicable to revise Attachment A to reflect the proposed withdrawal limit amount of 42 mgd.

It should be noted that individual system flows such as RWSS may be greater on a different day, but those days do not come close to representing the day where surface water withdrawal and consumptive use is greatest (peak day). A RWSS flow of 2,900 would occur only during shutdown or emergency conditions and will not occur on the day of maximum surface water withdrawal and consumptive use.

SRBC Comment No. 6.

Evaporation from the Essential Service Water Emergency Makeup System (ESWEMS) retention pond is 34.3 gpm. The Commission requires a description of the operation to provide makeup water from the RWSS, including the makeup rate and anticipated cycles of operation.

PPL Response:

The 34.3 gpm makeup rate was calculated based on the worst-case 30-day meteorological conditions that lead to the largest evaporation from the ESWEMS Retention Pond. This is the maximum rate that would be experienced and assumes no make-up to the pond from rain. The RWSS will supply the ESWEMS Pond through a pipe that has a manual valve that is controlled by plant operations. The pond normal water volume is 76.635 acre ft and the minimum water volume to satisfy its safety-related function is 47.308 acre ft. Margin over minimum volume at normal volume is 61.68%. Pond level will be monitored at least on a daily basis. The makeup flow will be adjusted on an as needed basis to maintain normal water level. The actual rate may vary on a daily basis and procedural controls will be implemented to ensure that total river peak day withdrawal rates never exceed the prescribed docket limit of 42 mgd. During winter months when ice has formed on the surface of the ESWEMS Retention Pond, the makeup from the RWSS will most likely be closed.

The pond is required to function for a 27-day period following a design basis accident. No makeup flow from the RWSS is required during this 27-day period. Except for short periods of testing, the pond is not used during normal operation. This testing will not have any affect on overall RWSS flow requirements.

SRBC Comment No. 7.
In a letter to the U.S. Nuclear Regulatory Commission, BNP-2011-025 dated January 28, 2011, Figure 3.3-1 on page 3-26 is the "Anticipated Water Use Diagram" which indicates the average and maximum water usage for BBNPP. The flows shown on this diagram are significantly different than those shown on the "BBNPP Peak Day Water Use Diagram." Of particular concern is the difference in the RWSS withdrawal which had an average flow of 1,921 gpm on the "Anticipated Water Use Diagram" and on the "BBNPP Peak Day Water Use Diagram" the same flow was indicated to be 952 gpm. The Commission requires reconciliation of the maximum/peak flows shown on the two diagrams. Consistent definitions and quantities may avoid confusion in the future.

PPL Response:

The two figures were prepared for different purposes and with different input based on available information at the time when they were prepared. The values for Figure 3.3-1 were derived in 2008 before any cooling towers curves were available and are meant to provide the system values individually. The values provided in PPL's Combined License Application Environmental Report Figure 3.3.-1 satisfied the NRC's need for representative flows for the individual systems. These values (flows) do not satisfy the values needed for SRBC applications for withdrawal and consumptive use. The "BBNPP Peak Day Water Use Diagram" is based on the latest information that is available and provides a snapshot in time to illustrate the peak day use based on the systems that would be in service.

For the RWSS Figure 3.3-1 has the flow 1,921 gpm which has two pumps in service supporting all four UHS towers. The higher evaporation rate then increases the blowdown flow and the makeup flow from RWSS is then greater. The "BBNPP Peak Day Water Use Diagram" has one RWSS pump in service providing 952 gpm supporting two UHS towers which is the number of RWSS pumps that would be in service on the peak day. The evaporation from the UHS towers and blowdown flow are based on the meteorological conditions that cause the largest main cooling tower evaporation. The UHS towers and the main cooling towers have different performance characteristics and will experience maximum evaporation under different meteorological conditions.

For the CWSMWS system Figure 3.3-1 has the flow 23,808 gpm which has two pumps in service supporting the two main cooling towers. This represents the towers operating at a design point which is not bounding. The "BBNPP Peak Day Water Use Diagram" has two CWSMWS pumps in service providing 25,035 gpm supporting the two main cooling towers. The higher evaporation rate is based on worst-case meteorological conditions to provide a bounding value. With the higher cooling tower evaporation rate, the cooling tower blowdown flow is increased and the CWSMWS flow is higher than the design point.