

Susquehanna River Basin Commission

a water management agency serving the Susquehanna River Watershed



July 6, 2015

Ms. Cindy Bladey, Chief
Rules, Announcements, and Directives Branch
Division of Administrative Services
Office of Administration
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RULES AND DIRECTIVES
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Re: Docket ID NRC-2008-0603:

SRBC Comments on Draft Environmental Impact Statement for
Combined License for Bell Bend Nuclear Power Plant

- References:
- 1) Letter from Mr. James Richenderfer, SRBC, to Ms. Laura Quinn-Willingham, NRC, dated August 12, 2013 (attached)
 - 2) Letter from Mr. James Richenderfer, SRBC, to Mr. Michael Caverly, PPL Bell Bend, LLC, dated March 26, 2013 (attached)
 - 3) Letter from Mr. Paul Swartz, SRBC, to Mr. Michael Caverly, PPL Bell Bend, LLC, dated December 28, 2012 (attached)
 - 4) Letter from Mr. James Richenderfer, SRBC, to Mr. Michael Caverly, PPL Bell Bend, LLC, dated June 27, 2012 (attached)

Dear Ms. Bladey:

The Susquehanna River Basin Commission (SRBC) appreciates the opportunity to provide comments regarding the Draft Environmental Impact Statement (DEIS) for the Combined License (COL) for the Bell Bend Nuclear Power Plant (BBNPP) prepared by the U.S. Nuclear Regulatory Commission (NRC) and the U.S. Army Corps of Engineers (USACE). PPL Bell Bend, LLC (PPL) proposes to construct a new nuclear power plant at a site adjacent to the existing Susquehanna Steam Electric Station (SSES) in Salem Township, Luzerne County, Pennsylvania.

SRBC is the primary agency responsible for the management of water resources in the 27,510-square-mile Susquehanna River Basin, and regulates water withdrawals and uses pursuant to Article 3, Section 3.10 of the Susquehanna River Basin Compact, P.L. 91-575, 84 Stat. 1509 et seq., and SRBC Regulations 18 Code of Federal Regulations (CFR) Parts 801, 806, 807, and 808. SRBC reviews withdrawals and consumptive uses in accordance with the general standards set forth in SRBC's *Consumptive Use Mitigation Plan* (Publication No. 253, adopted by SRBC Resolution No. 2008-01) and SRBC Policy No. 2012-01, *Low Flow Protection Policy Related to Withdrawal Approvals*, adopted on December 14, 2012.

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Call = T. Perry (NRC)
P. Vekun (PPL)

Fundamental to any authorization by the SRBC is a finding that the project is consistent with the "Comprehensive Plan for the Water Resources of the Susquehanna River Basin" (Comprehensive Plan) (dated December 2013, as amended June 2014), as mandated by the Susquehanna River Basin Compact.

The applicant submitted applications to the SRBC in 2009 for BBNPP for a water withdrawal of up to 42.0 million gallons per day (mgd) from the North Branch Susquehanna River (NBSR) and a consumptive use of that water of up to 28.0 mgd for plant operations and safety purposes. SRBC staff reviewed all submissions related to the BBNPP applications and, in a letter to PPL dated December 28, 2012, provided staff's anticipated recommendations regarding passby flow requirements/low flow protection and consumptive use mitigation, subject to change as specified, at PPL's request so that it could evaluate storage requirements to provide necessary releases to ensure uninterrupted operation of BBNPP. However, as you are aware, the applicant has not submitted a substantive plan addressing consumptive use mitigation and flow augmentation to meet low flow protection requirements for the BBNPP project.

SRBC's technical review was suspended in March 2013 (as described in SRBC's correspondence dated March 26, 2013), and remains so to date, pending submittal of sufficient information to address these and other deficiencies in the applications. When complete, the technical review will be used to develop appropriate recommendations to approve, limit, condition, or deny the withdrawal and consumptive water use at BBNPP to avoid significant adverse impacts, including adverse cumulative impacts, to the water resources of the basin.

GENERAL COMMENTS

SRBC notes that the DEIS addresses a wide array of issues to determine the environmental impact of BBNPP; however, it believes the discussion of water-related issues is lacking given the critical importance of uninterrupted cooling water to nuclear power generation and safety.

The reconnaissance-level evaluation, based on information largely supplied by the applicant, does not adequately address the technical challenges of the proposed withdrawals and consumptive use. Analysis of water-related issues is incomplete and in some cases incorrect, resulting in misinformation and possibly erroneous conclusions. SRBC's major concerns with the DEIS include:

1. The hydrologic analysis is over-simplified, which could lead to improper conclusions concerning levels of impact.
2. The plan for consumptive use mitigation and flow augmentation submitted by PPL lacks sufficient substantive detail for any credible technical review and is unlikely to succeed due to its inherent complexity.
3. The recently issued Finding of No Significant Impact for revised water supply operations at Cowanesque Lake would be rendered obsolete by the proposed changes to releases at Cowanesque Lake.

Specific comments on these key issues, as well as others, are discussed in the following sections.

COMMENTS REGARDING HYDROLOGIC ANALYSIS

Reader's Guide, Page 9 – The third paragraph relates the proposed consumptive use of surface water as a percent of mean annual flow but there is no similar mention of the consumptive use as a percent of low flows. Potential impacts would be expected to most likely occur during low flow events. As such, relating the consumptive use to low flows (7Q10, or monthly P95 during low flow months) would more accurately convey the magnitude and potential impact of the consumptive use to the general reader.

Page 2-27, Line 10 – It is stated that “post-regulation” streamflow statistics were calculated beginning in 1981 due to the completion of the last major upstream dam in 1980. While construction of large dams has the potential to alter hydrology, it has not been demonstrated that the changes in flow statistics are solely caused by the construction of the dams and not just correlated to the timing of their construction. As stated in the DEIS, the referenced dams have a combined drainage area of approximately 12 percent of the drainage area to the Wilkes-Barre gage. Additionally, the referenced dams with a listed purpose of water supply, which would be anticipated to have a higher occurrence of supplementing low flows (rather than recreation and flood control) have a drainage area of approximately 3 percent of the drainage area to the Wilkes-Barre gage.

The “period of record” used for the analysis in the DEIS excluded the most significant historic drought periods. As acknowledged earlier in Section 2.3.1.1, the droughts of record occurred from 1930 to 1934 and from 1962 to 1965. The approximate 30-year period of record used in the DEIS analysis includes only the droughts in 1999 and 1991, which are ranked, based on number of days with flows less than the monthly P95 (July through November), as number 10 and 19 at the Wilkes-Barre gage and 11 and 20 at the Harrisburg gage for the full period of record. The most important droughts are not included in the period of record in the DEIS, which underestimates potential impacts of the project during critical low flow periods.

For the reasons articulated in the above paragraphs, for this project, SRBC staff anticipates using the entire period of record for its technical review of BBNPP applications. The NRC should do the same. At minimum, the analysis in the DEIS should be expanded at the Wilkes-Barre gage to include the entire period of record.

COMMENTS REGARDING CONSUMPTIVE WATER USE MITIGATION

In correspondence dated August 12, 2013, SRBC provided comments to the NRC on PPL's submittal outlining generally how it intends to provide mitigation for BBNPP. At that time, although it could not identify any single fatal flaw due to the general nature of the proposal, SRBC characterized the development of an acceptable consumptive use mitigation/flow augmentation plan as “a significant challenge for PPL to meet.”

Significant information that would inform NRC's analysis remains absent from the record. SRBC regards the information in the DEIS describing the proposed consumptive water use and the related mitigation "plan" to be only conceptual in nature and of insufficient detail to satisfy SRBC's more rigorous review standards dictated by the codes and policies outlined above.

SRBC's Mitigation Requirements. There appears to be some confusion about SRBC's mitigation requirements in the DEIS (including, but not limited to, Sections 2.2.2.2, 2.3.1, 2.3.1.1, 2.3.2.1, 5.1.2.2, 5.2.2.1, 5.3.2.2, 7.2.2.1, 7.3.2.4, Table 10-2, and 10.2.2). SRBC makes a distinction between passby flow requirements and consumptive use mitigation. The distinction is important in the review of BBNPP because of the additional quantity of storage necessary to provide the proper protections to meet SRBC's requirements.

Passby flows are required for low flow protection for certain projects to avoid the significant adverse impacts related to a project's withdrawal (maximum instantaneous withdrawal rate and peak day withdrawal). Passby flows provide site-specific protection and commonly result in recommendations of an interruption of the withdrawal during designated low flow periods. Consumptive use mitigation is required of all approved consumptive water users to provide for broad protection of the water resources of the basin during periods of critical low flows. SRBC has contracted for programmed releases of water from storage to mitigate the impact of regulated consumptive losses on the main stem Susquehanna River and flows to the Chesapeake Bay.

In its December 28, 2012 letter, SRBC staff offered its recommendations for passby flows for BBNPP, based on its *Low Flow Protection Policy Related to Withdrawal Approvals* and on special aquatic studies conducted by the applicant (also see comments on "Aquatic Studies"). The letter also indicated that low flow protection requirements could be met by BBNPP using upstream releases of water from storage (flow augmentation) during designated low flow times in lieu of suspension of the withdrawal, thus avoiding periodic, temporary shutdown of the facility. In these preliminary findings, SRBC staff indicated that the amount of the release should "replace" the net withdrawal to mitigate potential significant adverse impacts downstream of the location of BBNPP's discharge. When passby flow protection periods coincide with critical low flow months, the flow augmentation releases to satisfy low flow protection requirements would also mitigate for consumptive use. However, low flow protection requirements also occur in May and June, and trigger at higher flows in July, so that offset releases would be more frequent than consumptive use mitigation. This is apparently not acknowledged nor is the total quantity of water storage necessary evaluated in the DEIS.

Complexity of the Plan. PPL's preferred consumptive use mitigation plan itself (described in Section 2.2.2.2 of the DEIS) hinges upon an unprecedented level of complexity while lacking realistic estimates of level of effort, cost, and time to secure necessary legal, financial, and regulatory approvals. Failure by PPL to execute any element of the plan would likely derail the approval process for the entire BBNPP mitigation/flow augmentation effort. The various challenges include, but are not limited to:

1. A plan for consumptive use mitigation/flow augmentation would have to be prepared, based on monthly maximum demand (the actual expected need during a drought) rather than long-term averages, during critical low flow months, and flow augmentation needs in the amount of the maximum net withdrawal triggered by designated monthly passby flow values for the months of May, June, and July;
2. A sequence of engineering and contractual arrangements would have to be secured;
3. Scientific studies for proposed water sources for consumptive use mitigation verifying sufficient storage quantities and reliable releases (or discharges) would need to be conducted;
4. Applications would have to be submitted to, and ultimately approved by, SRBC for the new projects and also the major modifications to existing projects (not all of which are controlled by PPL); and
5. Necessary revisions to policies, plans, and projects currently authorized by SRBC's Comprehensive Plan would have to be accomplished.

In order to secure mitigation water upstream of BBNPP, PPL's elaborate plan is to use storage in Cowanesque Lake that is currently allocated for other projects. To make this possible, PPL suggests it can substitute the new, untested and unapproved water sources of Ruston Mine (located on the West Branch) and Holtwood Dam/Lake Aldred (located downstream on the Susquehanna River) for consumptive use mitigation water at the Montour Steam Electric Station (MSES), which is owned by PPL, and Three Mile Island (TMI), which is located upstream of Holtwood Dam and not owned by PPL. The conceptual plan is highly speculative in its assumption that it is feasible to shift mitigation water storage obligations among multiple facilities, in essence creating "a house of cards" that will collapse if any element of this plan is found to be infeasible. As noted in the discussion that follows, there are significant questions and obstacles to each of these interrelated elements of PPL's conceptual plan.

COMMENTS REGARDING COWANESQUE LAKE

In its primary plan for consumptive water use mitigation, PPL stated its intent to rely on water stored in Cowanesque Lake to compensate for BBNPP consumptive use, both by planning "to reallocate to BBNPP the 13.6 cfs (8.8 Mgd) of Cowanesque Lake water currently used to mitigate consumptive use by PPL's Montour Steam Electric Station . . ." and by "purchasing rights to 36.8 cfs (23.8 Mgd) of Cowanesque Lake water currently allocated for mitigation of consumptive use downstream of PPL BBNPP."

Contracts. SRBC currently owns 23,494 acre-feet of water supply storage within the USACE's Cowanesque Lake, in accordance with the terms of a water supply storage contract signed in 1986. The lake is subject to sedimentation and periodic bathymetric surveys are conducted to determine the available water supply storage. The reallocation contract with the USACE specifies the purpose of the water storage to be consumptive use mitigation. Requirements for additional flow augmentation in May, June, and July, related to potential

adverse impacts from the withdrawal at BBNPP, are not consumptive use. As such, this poses a legal question that would have to be addressed and possible modification of the contract between SRBC and the USACE.

On Page 2-46, the DEIS notes that, "Of the water storage in Cowanesque Lake owned by the SRBC, 4,582 ac-ft are dedicated to mitigate the full consumptive use by TMI (19 Mgd), 13,061 ac-ft are available to mitigate up to 40 Mgd of consumptive use by SSES, and 3,000 ac-ft are available to mitigate part of the consumptive use (about 9 Mgd) of the Montour Steam Electric Station." SRBC and PPL have a contractual relationship (dating from 1986) that specifies rights to 66 percent of the water supply storage (rather than project-specific allocation rates in millions of gallons per day as indicated in the DEIS) to provide make-up for the consumptive use of water at SSES. In 1994, SRBC and PPL executed a settlement agreement related to the consumptive use of water at the MSES, which included approval of the use of 3,000 acre-feet of Cowanesque Lake water supply storage to help offset consumptive use at MSES.

Using the 3,000 acre-feet of water storage in Cowanesque Lake for consumptive use mitigation/flow augmentation for the BBNPP project, as outlined in the DEIS, would require reopening and revision of the contract that PPL has with the SRBC. Any re-designation of Cowanesque storage to any facility other than MSES may also affect the application of Article 8, Compliance with SRBC Regulations, of the June 1986 Consumptive Use Make-up Agreement executed by PPL and SRBC.

Similarly, any purchase of rights to an additional volume of water storage in Cowanesque Lake would require a new contract between PPL and the SRBC that could not be executed before the modification of approvals with new mitigation solutions for existing projects to be displaced by BBNPP. Page 2-16 of the DEIS indicates that PPL plans to reallocate to BBNPP the water in Cowanesque Lake currently used to mitigate consumptive use by PPL's MSES on the West Branch Susquehanna River, and also the water in Cowanesque Lake "currently allocated for mitigation of consumptive use downstream of the BBNPP"; which by default, must be TMI.

Storage Volume. Based on a cursory review, while it appears that the combined peak day quantities for the two facilities proposed to be reallocated exceed the rates requested for the new power plant (32.6 mgd vs. 28.0 mgd), the analysis does not appear to capture the potential complexities of the proposed transfer; therefore, not providing an accurate portrayal of potential impacts.

1. SRBC's water supply storage in Cowanesque Lake currently provides consumptive use mitigation water, while the water proposed to be allocated would be needed for both consumptive use mitigation and meeting low flow protection requirements. As the low flow protection discharges trigger prior to the consumptive use mitigation discharges, the analysis should evaluate 28.0 mgd of water being released earlier and for a longer duration of time.
2. Approximately 7,988 acre-feet of the allocations proposed to be obtained are currently released based on low flows at the U.S. Geological Survey (USGS) gage at

Harrisburg (for TMI), while the water needs for BBNPP would be released based on low flows at the USGS gage at Wilkes-Barre. The effects on reservoir storage of changing the trigger gage from the Harrisburg gage to the Wilkes-Barre gage does not appear to have been adequately evaluated in the analysis. These two gages are a straight-line distance of approximately 88 miles apart and have drainage areas that differ by over 14,000 square miles. Low flow events can be, and at times historically have been, localized in nature and the gages will reflect those differences.

3. SRBC staff completed an analysis of the full period of record for the 20 years with the greatest frequency of low flow events (days at or below monthly P95 flows) for the Harrisburg and Wilkes-Barre USGS gages. Of these 20 years, only 65 percent of the years having low flow events coincided for both gages. Of those years that did coincide, the duration of the events varied, sometimes dramatically. As an example, staff found that in 1962, 44 days of low flow occurred at Harrisburg while 71 days of low flow occurred at Wilkes-Barre. Releases may be needed on additional days when switching to the USGS gage at Wilkes-Barre.
4. For further illustration, an analysis was completed for 2 years of recent low flow events. In 1991, the demand of the existing projects proposed to be reallocated (TMI and MSES) would have been 1,065 acre-feet of water. During the same year, the proposed BBNPP would require 5,032 acre-feet, an almost five-fold increase. Similarly in 1999, demands for the projects to be reallocated was 1,474 acre-feet and proposed demand for BBNPP would be 5,117 acre-feet.

The DEIS should evaluate whether the volume of water supply storage available will be sufficient to meet BBNPP demands, throughout the entire period of record. In addition, SRBC is concerned that the DEIS analysis is incomplete in its assessment of impacts to Cowanesque Lake, particularly during the recreation season. Such an evaluation should include:

1. Expected changes to drawdown durations;
2. Potential that reservoir levels do not rebound in winter/spring; and
3. The impact of the simultaneous SSES and BBNPP drawdown.

Reservoir Operations. The USACE and SRBC have recently completed a major revision to the reservoir regulation manual for Cowanesque Lake to reflect new water supply operations for existing agreements with utilities that need water from Cowanesque Lake for consumptive use mitigation. The revised manual includes a water supply release plan specifically formulated to address consumptive use needs at SSES, TMI, and MSES based on the results of a series of technical investigations and to more closely align with thresholds contained in SRBC's *Low Flow Protection Policy Related to Withdrawal Approvals*. As part of the evaluation of the proposed water supply operations, the USACE required a complete technical and environmental review of the reservoir operations and analyses of environmental and recreational impacts at Cowanesque Lake. This review process began in 2007 and, after almost a decade of work, is in the final stages of implementation pending final USACE approval of the

reservoir regulation manual. During the review process, a Finding of No Significant Impact was rendered in September 2013, that the changes in operation of the reservoir would not pose a significant environmental impact.

Using Cowanesque Lake for consumptive use mitigation and meeting low flow protection requirements for the BBNPP project would involve changes to the trigger location, timing of releases, and quantity of water released, and have not been adequately investigated in the DEIS. Changes (additions or alterations) to the water supply release plan would likely render obsolete the earlier findings, and are likely to require the USACE reservoir regulation manual to be revised again. SRBC anticipates that another complete technical and environmental review of the operation of the reservoir would be required by the USACE.

SRBC expects that the reservoir drawdowns resulting from releases for low flow protection compliance and consumptive use mitigation for the BBNPP project would increase in frequency and magnitude over the drawdowns contemplated in the recent technical studies, environmental assessment, and Finding of No Significant Impact. Sections 5.3.1.2, 5.3.2.2, and 7.2.1.1 of the DEIS outline the magnitude of the increased reservoir drawdowns. The impact of dewatering shallow area habitat, dewatering wetlands, and reduced recreational opportunities would have to be evaluated as part of the technical review process. If the impacts are determined to be significant, the review process could require more time to complete or render the use of Cowanesque Lake infeasible. Due consideration should be given to the time frame when evaluating the viability of using Cowanesque Lake to mitigate consumptive use for the BBNPP project.

COMMENTS REGARDING HOLTWOOD HYDROELECTRIC STATION

Part of the PPL conceptual plan to provide consumptive use mitigation for BBNPP is to use storage at Holtwood Dam/Lake Aldred (Section 2.2.2, Page 2-16). Page 2-16, Line 29 – It is stated that PPL controls sufficient water at the Holtwood Dam site to compensate for consumptive use downstream of the BBNPP site. The plan proposes that the storage at Holtwood Dam would provide consumptive use mitigation for TMI to replace the mitigation capacity currently used to mitigate TMI from Cowanesque Lake, and that capacity would then be reallocated to mitigate for BBNPP.

PPL submitted an application on March 9, 2012, for the Holtwood Hydroelectric Station to provide consumptive use mitigation for BBNPP as part of a proposed Corporate Stored Asset Plan. SRBC staff responded to the application in correspondence dated June 27, 2012. SRBC found that it could not recommend approval of operations at Holtwood, as proposed at that time, to meet the mitigation requirement at BBNPP. SRBC staff's comments on the general concept of Holtwood Dam as a mitigation source included:

1. Holtwood's downstream location would leave parts of the river unmitigated during designated low flow periods for any upstream consumptive use. In order to ensure appropriate consumptive use mitigation is restored, the quantity of mitigation water "in play" must be replaced by another source upstream of the designated consumptive use.

2. The plan assumes that Safe Harbor will be operated as “run of river.” Safe Harbor is not operated as a run of river facility during low flows; it is operated as a peaking facility. With no requirement in place for minimum releases and the large storage capacity at Safe Harbor, there is no assurance that inflows to Holtwood will be sufficient to maintain the proposed operating regime.
3. PPL’s OASIS model of its conceptual plan for consumptive use mitigation operations at Holtwood is constructed with invalid assumptions and incorrect data and, as such, its results are unreliable.

Both Holtwood and Conowingo have minimum pool elevations and releases designated in their respective Federal Energy Regulatory Commission (FERC) licenses that should be considered in the DEIS’s evaluation of potential impacts related to storing water in Holtwood Dam during low flows. For example, although the water volume at Holtwood may be sufficient to meet consumptive use needs if that were its only purpose, there is little predictable and manageable active water storage in Lake Aldred due to FERC-licensed pool requirements.

The manipulation of releases from Holtwood Dam for consumptive use mitigation may require review under the *Conowingo Pond Management Plan*. The plan, issued in 2006, took 4 years to develop, requiring cooperation of 28 work group members representing 18 Pennsylvania and Maryland state agencies, municipal governments, involved utilities, and the SRBC.

Holtwood Dam is located downstream of TMI. Although the DEIS (Page 5-12) discusses the TMI release as being smaller than that for BBNPP and being located on a larger water body, it does not thoroughly evaluate the potential adverse impacts to the 35-mile unprotected reach of the main stem Susquehanna River possibly incurred by moving the mitigation source downstream. If the concept of using Holtwood Dam storage as a mitigation source for TMI is found to be unacceptable, alternate mitigation sources would need to be identified and reviewed.

Further, TMI’s surface water withdrawal currently operates without passby flow requirements. Changing the mitigation source for TMI will require new reviews using current SRBC regulations and policies, including the *Low Flow Protection Policy Related to Withdrawal Approvals*. Should such a review demonstrate that low flow protection is required for TMI, SRBC may determine that flow augmentation needed to offset that requirement would need to be upstream of TMI, and therefore could disqualify Holtwood as a mitigation option.

COMMENTS REGARDING RUSHTON MINE

Part of PPL’s conceptual plan to provide consumptive water use mitigation for BBNPP is to expand its water treatment operations at Rushton Mine to provide consumptive use mitigation releases for PPL’s MSES (Sections 2.2.2 and 5.2.2.1, Page 5-11). PPL (PPL Bell Bend 2013-TN3541) stated that it plans “to reallocate to BBNPP the 13.6 cfs (8.8 Mgd) of Cowanesque Lake water currently used to mitigate consumptive use by PPL’s Montour Steam Electric Station” Rushton Mine, a former underground coal mine that is owned by PPL,

currently pumps and treats an estimated maximum of 6.9 cubic feet per second (cfs) (4.5 mgd) of groundwater for discharge to Moshannon Creek (PPL Bell Bend 2013-TN3541).

An application for Rushton Mine, submitted by Pennsylvania Mines LLC (a PPL company), was received by SRBC on December 28, 2011. The stated purpose was for the maintenance of a mine pool level and also for partial mitigation of consumptive use for PPL facilities. On November 27, 2013, the applicant requested to withdraw its application. SRBC has not reviewed the existing groundwater withdrawal; however, it has reviewed several projects involving withdrawals from inactive coal mines and the technical challenges are significant. It is particularly challenging to accurately characterize the available storage and water quality of the mine pool during critical low flows without recent pumping and drawdown data. Water quality data are particularly important so that treatment can be evaluated and upgraded if needed to meet contemporary standards.

To qualify as mitigation water, the discharge from Rushton Mine would have to be increased over the historic amount by the amount of the consumptive use at MSES during critical low flow periods. SRBC's general experience is that water production from mine pools may not meet volumetric expectations and therefore, test pumping is required to confirm yields and evaluate any impacts during low flow periods. NRC should consider in the DEIS other possible supplemental or alternate sources that may be necessary for mitigation water in the West Branch watershed.

Page 5-11 – In its analysis in the DEIS, NRC triggered releases from Rushton by flows at Wilkes-Barre using flow targets anticipated for BBNPP. Although mitigation releases for MSES are currently triggered at the Wilkes-Barre gage, any future consumptive use mitigation asset in the West Branch Susquehanna subbasin dedicated to MSES should consider a West Branch Susquehanna River (likely Williamsport) trigger gage. As drought events can be highly localized, the analysis conducted for the DEIS may not accurately assess potential impacts.

COMMENTS REGARDING ALTERNATE POWER SUPPLY ANALYSIS OF COMBINED-CYCLE GAS TURBINES (CCGTs)

Section 9.2.2.2 of the DEIS provides a comparison of the environmental impact of nuclear power plants versus natural-gas-fired power plants (CCGTs) using combined-cycle technology. SRBC comments pertain to the water consumption aspect of power generation. About 73 percent of all water consumed in the Susquehanna River Basin is used for power generation. From a cumulative consumptive use standpoint, the power generation segment of water users is clearly significant with regard to water resources in the basin.

The analysis in Section 9.2.2.2 is somewhat outdated, using a previous analysis for SSES, and does not compare CCGTs of similar size as BBNPP. The analysis would be more appropriate if it used current CCGT technology and two 800-MW CCGT units, which are fairly standard. Further, SRBC believes the benefits of CCGTs with regard to consumptive water use are understated in the DEIS. The statement in the second paragraph under "Other Impacts" that CCGTs consume one-third of the water that a similarly sized nuclear power would is true, but should be expanded. For example, the proposed consumptive water use for BBNPP is estimated

to be 28.0 mgd. A similarly sized CCGT plant using wet cooling technology would consume approximately 7.4 mgd, a very significant and beneficial difference as compared to BBNPP.

Page xl, Table ES-4 – The environmental impact for water use and quality for both a nuclear and natural gas fuel power plant are both listed as small. The requested consumptive use quantity for the proposed nuclear power plant equates to approximately 730 gal/MWh while currently proposed natural gas power plants are requesting approximately 300 gal/MWh for evaporative cooling systems and only 5 to 10 gal/MWh for dry cooling systems. SRBC questions the value of utilizing the same classification of environmental impact (small) for such a wide range of consumptive use values.

Dry cooling technology is a viable option for CCGTs because of the efficiency of the power generation process. The 28.0 mgd of consumptive use for BBNPP would be compared to about 0.2 mgd consumptive use of water for a 1,600-MW CCGT power plant utilizing dry cooling technology, or about 0.7 percent of the water needed for BBNPP. The result is that there are almost no environmental impacts to aquatic resources or the hydrology of the river. SRBC believes that CCGT with dry cooling technology constitutes a large beneficial impact for water resources.

To formally recognize the benefits of dry cooling technology, SRBC adopted Resolution No. 2015-02 on March 5, 2015, promoting its use for power generation. There is an operating CCGT power plant utilizing dry cooling in the region, the 839-MW Hunterstown Plant, demonstrating the viability of the technology under contemporary conditions. Additionally, two CCGT power plants designed with dry cooling are under construction (Liberty and Patriot), and two more are currently in the permitting process within the basin.

SRBC requests that a separate subsection be added to Section 9.2.2.2 that properly analyzes the alternate power generation option of CCGT power plants with dry cooling.

COMMENTS REGARDING THE NEED FOR POWER ANALYSIS

SRBC notes that there are more combined-cycle natural gas (CCGT) power plants planned in the basin than are included in DEIS analysis. The projects listed in Table 7-1, *Past, Present, and Reasonably Foreseeable Project and Other Actions Considered in the BBNPP Cumulative Analysis*, should be revised to include the following projects that have applications submitted to SRBC and other partner agencies:

1. Moxie Freedom (~1,000 MW, Salem Township, Luzerne County, Pennsylvania)
2. Invenergy – Lackawanna Energy Center (~1,500 MW, Jessup Borough, Lackawanna County, Pennsylvania)
3. Hunlock Creek Expansion (~170 MW increase, Hunlock Township, Luzerne County, Pennsylvania)

4. Panda/Sunbury Generation/Hummel Station Repowering and Expansion (~1,000 MW, Monroe Township, Snyder County, Pennsylvania)

The DEIS states on Page 7-1, Line 20, “future actions are those that are reasonably foreseeable through the building and operation of the proposed BBNPP, including decommissioning.” While SRBC does not specifically monitor trends in power plant applications, it does appear that there has been an increase in interest in siting CCGT power plants in the Susquehanna River Basin. Several pre-application and planning discussions about additional CCGT power plant projects have been held with SRBC staff. Current market conditions and the development of Marcellus shale gas favor development of additional CCGTs.

COMMENTS REGARDING AQUATIC STUDIES

Section 5.2.2.1 provides a discussion of the anticipated passby flow requirements for BBNPP that were defined by SRBC staff in a letter to PPL dated December 28, 2012. These requirements were established after lengthy review of aquatic studies and a series of meetings with PPL and other resource agencies, specifically to mitigate the potential significant adverse impact of the withdrawal of 42.0 mgd and net withdrawal (or consumptive use) of 28.0 mgd of the BBNPP during low flow conditions in the Susquehanna River.

While Section 2.4.2.1 provides an adequate discussion of two reports used extensively to establish necessary low flow protection (referred to in Section 11.0 as Normandeau, 2012 – TN1607 and Kleinschmidt et al., 2012 – TN1608), another two of the main aquatic studies used for this review should be discussed in the DEIS. These reports are *Potential Effects of the Bell Bend Project on Aquatic Resources and Downstream Users* (DEIS reference Normandeau, 2012 – TN1605) and *Potential Effects of the Bell Bend Project on the Water Quality of the Backwater Areas Used by Fry and Young-Of-The-Year Smallmouth Bass for the Year 2012* (DEIS reference Normandeau et. al., 2012 – TN1945). Note that Section 11.0 incorrectly references the study plan for the report (Normandeau et. al., 2012 – TN1945) instead of the report itself.

Due to the importance of the two studies referenced above in establishing the potential impacts of the net withdrawal of the BBNPP on the NBSR and setting appropriate low flow protection requirements, SRBC staff requests that Section 2.4.2.3 be expanded to reference the reports, acknowledge the potential significant adverse impact of the net withdrawal, and indicate agreement that the low flow protection through flow augmentation is necessary to avoid plant shutdown.

The Normandeau et. al. TN1605 report also indicates potential impacts to fish species other than Smallmouth Bass, such as the Northern Hogsucker. Even though these other species may not have recreational value, SRBC and other resource agencies have determined them to be an important component of the aquatic life in the river. Section 2.4.3.2 should be expanded to discuss these species as well.

The potential significant adverse impacts of BBNPP’s net withdrawal to aquatic communities and their habitat would only be mitigated under current standards by implementation of the defined passby flow offset requirements. The discussion in the DEIS

should be broadened to promote better understanding of the importance of establishing the low flow protection beyond simply mitigation of the consumptive water use.

COMMENTS REGARDING OTHER TEXT CORRECTIONS

1. Table 5-1 does not seem to consider the additional reduction of NBSR flows as measured at Wilkes-Barre from SSES, which underestimates the potential adverse cumulative impacts related to the project.
2. Page H-6 – Susquehanna River Basin Commission:
 - a. The “Authority” section should be deleted in its entirety and replaced with “18 CFR Parts 801-808; Susquehanna River Basin Compact.”
 - b. The “Activity Covered” section should be corrected to read “Water withdrawal >100,000 gpd (*30-day average*) or consumptive use >20,000 gpd (*30-day average*). Covers withdrawals from groundwater *and surface water within* the Susquehanna River *Basin*.”
 - c. The “Anticipated Application Submittal Date” is incorrectly listed as “Complete.” SRBC has not found the applications submitted to date by the project sponsor to be complete. As discussed in our August 12, 2013, letter to your office, the review has been suspended pending submittal of additional information and a timeline for addressing the deficiencies has not been received.
3. Page 11-77, Line 31 – “835,000 mgd” should be deleted and replaced with “835.000 mgd.”
4. Page 11-77, Line 32 – “23,100 mgd” should be deleted and replaced with “23.100 mgd.”
5. References to all letters listed in the beginning of this letter should be included.
6. Entire Document – References throughout the document to “Susquehanna River *Board* Commission” should be corrected to read “Susquehanna River *Basin* Commission.”

CONCLUSIONS

The NRC staff’s preliminary environmental recommendation in the DEIS is that a license for the new reactor could be issued, based on its assessment of information primarily supplied by the applicant. However, there remains a number of issues related to impacts to water resources that should be resolved, and outstanding and necessary document submittals and studies that should be considered in making any determination.

In particular, our review of the conceptual storage plan proposed to meet SRBC’s requirements for low flow protection and consumptive use mitigation is fraught with obstacles and flawed in several respects, lacking a demonstration of sufficient quantity of stored water and

acceptable operations plans (trigger locations, trigger periods, trigger release rates) for the timely and reliable release of that water at the several facilities indicated. Based on these factors alone, SRBC would suggest that NRC's preliminary conclusion is premature.

Considering that water availability is critical for operations and safety of the project, SRBC finds from our review of the DEIS that the evaluation of the environmental impact of the project is incomplete and unbalanced, and therefore does not give policymakers and the public the full picture that is needed to make reasoned and balanced choices on the use of the Susquehanna basin's water resources.

Should you have any questions regarding the review process, or if SRBC staff can assist you in any way, please contact Andy Gavin at (717) 238-0423.

Sincerely,



Andrew D. Dehoff, P.E.
Executive Director

Attachments

COPY

Susquehanna River Basin Commission

a water management agency serving the Susquehanna River Watershed



August 12, 2013

Ms. Laura Quinn-Willingham
Project Manager
U.S. Nuclear Regulatory Commission
11545 Rockville Pike, Mailstop: T-6 C32
Rockville, MD 20852

Re: Consumptive Water Use Mitigation for PPL Bell Bend, LLC;
Bell Bend Nuclear Power Plant;
Salem Township, Luzerne County, Pennsylvania;
Commission Pending Nos. 2009-079 (SW), 2009-080 (CU), and 2012-007 (GW)

Dear Ms. Quinn-Willingham:

The purpose of this letter is to respond to the recent inquiry from the Nuclear Regulatory Commission (NRC) regarding the conceptual plan submitted by PPL Bell Bend, LLC (PPL) to satisfy the Susquehanna River Basin Commission's (SRBC's) consumptive use mitigation and passby flow requirements for the proposed Bell Bend Nuclear Power Plant (BBNPP). PPL submitted the plan to NRC in response to RAI ENV-19 in December 2012. This letter outlines SRBC's general review process and substantive consumptive use mitigation requirements related to the BBNPP project, as you had requested during our conference call of June 12, 2013.

BBNPP applications are being reviewed under Section 3.10 of the Susquehanna River Basin Compact and 18 CFR Part 806, the general standards set forth in the Commission's *Consumptive Use Mitigation Plan* (Publication No. 253, adopted by Commission Resolution No. 2008-01) and Commission Policy No. 2012-01, *Low Flow Protection Policy related to Withdrawal Approvals*, adopted on December 14, 2012. More specifically, the proposed withdrawal from the Susquehanna River and the consumptive use of that water, and the proposed groundwater withdrawal for construction dewatering, are being reviewed under 18 CFR §806.4, §806.22, and §806.23 to develop appropriate recommendations to limit, condition, or deny the withdrawal to avoid significant adverse impacts, including adverse cumulative impacts to the water resources of the basin.

The Commission staff has reviewed all submissions related to the BBNPP applications and, based on its current evaluation, the Commission staff has provided PPL with recommendations regarding passby flow requirements and consumptive use mitigation recommendations for the BBNPP project, subject to change as specified, in a letter to PPL dated December 28, 2012. These recommendations were developed so that PPL could evaluate storage

requirements to provide consumptive use mitigation water and to provide augmentation flows to assure passby flow requirements do not cause an interruption in the operation of BBNPP.

PPL's current submittal outlining how it intends to provide mitigation and flow augmentation for BBNPP is very conceptual in nature and, as such, lacks sufficient detail to be evaluated by Commission staff. Review of the BBNPP applications is currently suspended, pending submittal of information to address deficiencies. An evaluation of upstream storage requirements includes not only the quantity of stored water, but also acceptable operations plans for the timely release of that water. Additional information concerning the status of the review of the applications was contained in a letter to Michael J. Caverly, PPL, dated March 26, 2013, which you were previously copied on.

SRBC staff's review of PPL's consumptive use mitigation and flow augmentation proposal to address passby conditions for the BBNPP project would entail the following:

- Receipt of a plan from PPL with substantive details identifying specific upstream sources to be used to satisfy consumptive use mitigation and flow augmentation to meet passby requirements for BBNPP project;
- Verification that PPL has obtained and/or executed, and could reasonably expect to implement, all necessary contractual arrangements associated with these sources;
- Evaluation of the adequacy of mitigation for the consumptive water use and augmentation available to meet passby requirements (standards in place at that time would be applicable):
 - Are the appropriate mechanical controls (or designs) in place to operate the compensating water releases?
 - Has PPL established monitoring and/or notification protocols for identifying the thresholds that will prompt or implement releases?
 - Is the proposed storage sufficient to supply the required volume of water over the expected duration of need (90 days for mitigation of consumptive use; some additional amount would be needed for passby requirements)?
 - Have necessary impact studies been performed and demonstrated that other resources would not be adversely impacted by the mitigation operation?
 - To the extent supplemental or an additional source of upstream storage is proposed, there will need to be a review in terms of quantity and alignment of release operations to satisfy augmentation requirements.
- To the extent the mitigation strategy proposes to supplement or replace existing approved sources of mitigation for current power plant operations, PPL will need to make any necessary arrangements/applications for appropriate replacement water storage.
 - PPL will need SRBC review and approval of the supplemental mitigation in terms of quantity, timing and location being sufficient to continue to provide mitigation that satisfies contemporary standards.

- o To the extent that replacement mitigation is proposed to be introduced downstream of the consumptive use, SRBC will need to conduct a review to verify that downstream mitigation could be recommended by staff.
- o Coordination with federal and state agencies regarding water quality, ecological needs and requirements related to discharge permitting.

A few additional procedural details that are noteworthy:

- o Upon initiating review of the mitigation proposal, Commission staff would then resume its review of the pending aquifer testing waiver request, groundwater withdrawal application, and Approval by Rule for water use during construction activities.
- o All applications would be subject to public hearings prior to any action by the Commission. In addition to the standard process, SRBC may want to have a special hearing or public information meeting on these applications, given the magnitude of this proposed project.
- o The project is subject to Commission regulations and policies in effect at the time of Commission action.
- o Other caveats for review are described in the correspondence of March 26, 2013, referenced above.

In the most general terms, Commission staff would be able to recommend approval of the BBNPP project if/when PPL can demonstrate that it has a sufficient quantity of stored water under its control, that this water is available at acceptable upstream location(s), and that this water can be released by PPL to satisfy both consumptive use mitigation and passby flow requirements, and any other regulatory and legal requirements in effect at the time of Commission action. While this may represent a significant challenge for PPL to meet, Commission staff are otherwise reasonably sure that there are no fatal flaws apparent with the primary option identified in PPL's conceptual plan. To the extent that this primary option involves a reallocation of storage currently utilized for mitigation of other projects, we offer no opinion about the consequence of such a reallocation on those other projects.

Should you have any questions regarding the review process, or if Commission staff can assist you in any way, please contact Tom Beauduy at (717) 238-0423, extension 1305.

Sincerely yours,



James L. Richenderfer, Ph.D., P.G.
Deputy Executive Director

cc: Michael J. Caverly – PPL Bell Bend, LLC
Gary Petrewski – PPL Bell Bend, LLC
Kelly Heffner – PA Alternate Commissioner
Amy Elliott – USACE
Heidi Biggs – PADEP
J. R. Holtsmaster – PADEP
Mark Hartle – PFBC
Jennifer Kagel – USFWS
Lora Zimmerman – USFWS
Jamie Davis – USEPA

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Susquehanna River Basin Commission

a water management agency serving the Susquehanna River Watershed



March 26, 2013

Mr. Michael J. Caverly
VP-Nuclear Project Development
PPL Bell Bend, LLC
Two North Ninth Street
Allentown, PA 18101-1179

Status of Commission Review of Applications
for PPL Bell Bend, LLC – Bell Bend Nuclear Power Plant;
Salem Township, Luzerne County, Pennsylvania;
Commission Pending Nos. 2009-079 (SW), 2009-080 (CU), and 2012-007 (GW)

Dear Mr. Caverly:

The purpose of this letter is to provide PPL Bell Bend, LLC (PPL) with the current status of the Susquehanna River Basin Commission (Commission) staff's review of the consumptive water use, surface water withdrawal, and groundwater withdrawal applications submitted for the Bell Bend Nuclear Power Plant (BBNPP). The letter also outlines general conditions that would be required in order for staff to recommend approval of the applications at a future date.

The applications are being reviewed under Section 3.10 of the Susquehanna River Basin Compact and 18 CFR Part 806, the general standards set forth in the Commission's *Consumptive Use Mitigation Plan* (Publication No. 253, adopted by Commission Resolution No. 2008-01) and Commission Policy No. 2012-01, *Low Flow Protection Policy related to Withdrawal Approvals*, adopted on December 14, 2012. More specifically, the proposed withdrawal from the Susquehanna River and the consumptive use of that water, and the proposed groundwater withdrawal for construction dewatering, are being reviewed under 18 CFR §806.4, §806.22, and §806.23 to develop appropriate recommendations to limit, condition, or deny the withdrawal to avoid significant adverse impacts, including adverse cumulative impacts to the water resources of the basin.

The Commission staff has reviewed all submissions related to the BBNPP applications and, based on that review, the staff acknowledges that all requested information and studies required for review of passby requirements have been received. Based on its current evaluation, the Commission staff has provided PPL with recommendations regarding passby flow requirements and consumptive use mitigation recommendations for the BBNPP project, subject

to change as specified, in a letter to you dated December 28, 2012. These recommendations were developed so that PPL could evaluate storage requirements to provide consumptive use mitigation water and to provide augmentation flows to assure passby flow requirements do not cause an interruption in the operation of BBNPP. Note that an evaluation of storage requirements includes not only the quantity of stored water, but also acceptable operations plans for the timely release of that water. In a letter to you dated June 27, 2012, the Commission staff clarified the requirement that the source of mitigation water and flow augmentation must be upstream of BBNPP to assure that there are no significant impacts to aquatic life in the vicinity of BBNPP.

PPL's current submittal outlining how it intends to provide mitigation and flow augmentation for BBNPP is very conceptual in nature and, as such, lacks sufficient detail to be evaluated by Commission staff. Regardless of the source of mitigation waters, substantive details must be submitted to Commission staff before we can evaluate the merit of any plan.

In the most general terms, Commission staff would be able to recommend approval of the BBNPP project if/when PPL can demonstrate that it has a sufficient quantity of stored water under its control, that this water is available at acceptable upstream location(s), and that this water can be released by PPL to satisfy both consumptive use mitigation and passby flow requirements described in our correspondence to you dated December 28, 2012.

Because a detailed plan identifying specific sources to be used to satisfy mitigation and passby requirements for BBNPP has yet to be submitted by PPL, both the consumptive water use and surface water withdrawal applications are deficient at this time. Commission staff cannot continue its review until PPL provides such plan. Further, if any elements of the plan involve third parties, contracts must be in place to provide the required resources prior to staff's formulating recommendations for Commission action. Additionally, reformulation studies and approvals from other agencies, such as the USACE and the Pennsylvania Department of Environmental Protection (PADEP), must be substantially complete to assure that any action by the Commission will be supported by its members.

The timeframe for final action on the applications by the Commission cannot be determined until PPL provides a detailed timeline for addressing this deficiency and associated activities to be completed. At such time as PPL provides the additional information required for these applications, Commission staff will resume its review of the pending consumptive water use and surface water withdrawal applications.

With regard to the pending groundwater application, Commission staff will also consider the aquifer test waiver for proposed dewatering for excavations at the BBNPP site when we resume our reviews.

In a related matter, issuance of the Approval by Rule (ABR) for water use during the construction of BBNPP will be coordinated with actions on the other applications discussed above.

Should you have any questions regarding the review process, or if Commission staff can assist you in any way, please contact Jim Richenderfer at (717) 238-0423, extension 224.

Sincerely yours,



James L. Richenderfer, Ph.D., P.G.
Director, Technical Programs

cc: Gary Petrewski – PPL Bell Bend, LLC
Kelly Heffner – PA Alternate Commissioner
Amy Elliott – USACE
Heidi Biggs – PADEP
J. R. Holtsmaster – PADEP
Mark Hartle – PFBC
Jennifer Kagel – USFWS
Lora Zimmerman – USFWS
Jamie Davis – USEPA
Laura Quinn-Willingham – USNRC

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December 28, 2012

Mr. Michael J. Caverly
VP-Financial Nuclear-Development
PPL Bell Bend, LLC
Two North Ninth Street
Allentown, PA 18101-1179

Re: Requirements for Consumptive Water Use Mitigation and Passby Flows
for PPL Bell Bend, LLC – Bell Bend Nuclear Power Plant;
Salem Township, Luzerne County, Pennsylvania;
Commission Pending Nos. 2009-079 (SW) and 2009-080 (CU)

Dear Mr. Caverly:

The purpose of this letter is to provide PPL Bell Bend, LLC (PPL) with Susquehanna River Basin Commission (Commission) staff's recommendations for consumptive use mitigation and passby flow requirements for the Bell Bend Nuclear Power Plant (BBNPP). In lieu of PPL's request for a "conditional approval" in March 2013, staff is amenable to providing a letter in this time frame that details the status of PPL's BBNPP application and outlines general conditions that would be required in order for staff to recommend approval of the application at a future date.

The *Consumptive Water Use Application* and the *Surface Water Withdrawal Application* submitted by PPL are being reviewed for content with respect to Commission regulations under Section 3.10 of the Susquehanna River Basin Compact and 18 CFR §806, Subpart B (Application Procedure), and the general standards set forth in the Commission's *Consumptive Use Mitigation Plan* (Publication No. 253, adopted by Commission Resolution No. 2008-01) and Commission Policy No. 2012-01, *Low Flow Protection Policy related to Withdrawal Approvals*, adopted on December 14, 2012.¹ More specifically, the proposed withdrawal from the Susquehanna River and the consumptive use of that water are being reviewed under 18 CFR §806.4, §806.22, and §806.23 to develop appropriate recommendations to limit, condition, or deny the withdrawal to avoid significant adverse impacts, including adverse cumulative impacts to the water resources of the basin.

¹ Commission Policy No. 2012-01 has very recently replaced Commission Policy No. 2003-01, *Guidelines for Using and Determining Passby Flows and Conservation Releases for Surface-Water and Ground-Water Withdrawal Approvals*, previously adopted in 2003. The project applications are subject to regulations and policies in effect at the time of Commission action.

CONSUMPTIVE WATER USE MITIGATION

To avoid adverse impacts, Commission staff has determined that the appropriate form of consumptive use mitigation should be the utilization of compensating releases from storage upstream of the project. It has further determined that low flow releases equal to the consumptive use at the BBNPP should trigger when a flow at the Wilkes-Barre U.S. Geological Survey (USGS) stream gage reaches a flow level of the monthly P95 exceedance value (with exceptions noted herein), plus the designated consumptive use in the vicinity of the gage. By tying mitigation to the elimination of consumptive use impacts, we are assured of accomplishing efficient and comprehensive mitigation. Current regulations at 18 CFR §806.22 require acceptable mitigation releases of water from Commission-approved sources for a period of 90 days.

PASSBY FLOW REQUIREMENTS

As previously discussed, an important requirement will be for PPL to release water (in an amount equal to the plant's consumptive water use) upstream of the proposed plant when passby flow levels are reached. In support of applications submitted for its proposed BBNPP, PPL elected to conduct special project-specific aquatic studies, as provided for under both Commission Policy Nos. 2003-01 and 2012-01, to support alternate passby flow requirements. The Commission has received the following reports citing findings of these studies conducted by PPL or its authorized representatives:

1. **Potential Effects of the Bell Bend Project on Aquatic Resources and Downstream Users** (Volumes 1 and 2), Report No. 21665.001-LFHC3, prepared for PPL Bell Bend, LLC by Normandeau Associates, Inc., dated April 24, 2012
2. **Potential Effects of the Bell Bend Project on Water Quality of Backwater Areas used by Fry and Young-of-the-Year Smallmouth Bass for the Year 2012** (Volumes 1 and 2), Report No. 21665.001-SMB2, prepared for PPL Bell Bend, LLC by Environmental Resources Management, dated September 10, 2012
3. **Bell Bend Nuclear Power Plant Low Flow Impact Analysis-Mussels**, Document No. 565-065 Rev. 0, prepared for PPL Bell Bend, LLC by Kleinschmidt and others, dated October 2012

In general, Commission Policy No. 2012-01 recommends standard monthly passby flows equal to the calculated P95 monthly percent exceedance values for withdrawals from rivers in Aquatic Resource Class 6, which is the appropriate classification to apply given the location of the proposed project. In consideration of Commission Policy No. 2012-01 and the special aquatic studies, Commission staff recommends imposition of the passby flows identified in the table below. All recommended passby flows, as a percentage of average daily flow, are lower than those that would result from implementing the previous Commission Policy No. 2003-01, which recommended a passby flow of 20 percent of the annual average daily flow for a Warm Water Fishery. For USGS gage 01536500 for the Susquehanna River at Wilkes-Barre,

Pennsylvania, 20 percent average daily flow is 2,753 cubic feet per second (cfs). Note that recommended passby flow values listed in the table are adjusted to the project site location.

Recommended Passby Flows

Month	Passby Flow at the BBNPP Site (cfs)
January	None
February	None
March	None
April	None
May	1,750
June	1,750
July	1,750
August	1,200
September	890
October	1,010
November	None
December	None

Species of Concern

Freshwater mussel species (Green Floater, Yellow Lamp, Elktoe, and others) are present. A significant decrease in the smallmouth bass (SMB) population in the Susquehanna River has been documented; the cause is still being investigated by USGS, the Pennsylvania Fish and Boat Commission (PFBC), and others. The Instream Flow Incremental Methodology (IFIM) study focused on eight targeted fish species as indicator species. BBNPP consumptive use was shown in the study to impact various life stages of the targeted species, with the northern hogsucker being the most impacted.

Special Considerations

Another nuclear power plant, Susquehanna Steam Electric Station (SSES), is located immediately upstream of the proposed BBNPP site. Consumptive water use by SSES is not mitigated until flows at the Susquehanna River at Wilkes-Barre gage reach 7Q10 (835 cfs); therefore, the combined consumptive water use by both BBNPP of 43 cfs and SSES of 74 cfs, as well as the two thermal discharges, must be evaluated for impacts to aquatic life and other users located downstream from BBNPP. The locations of these two PPL plants downstream from the Wilkes-Barre gage will also be a factor in setting flow values at the gage for compliance monitoring.

The unusual channel morphology and associated hydraulics become increasingly important as flows decline and bedrock ridges and gravel bars emerge. In particular, an existing gravel bar dewateres critical Green Floater mussel habitat at flows below 1,300 cfs.

The months of May through July are indicated as critical months for young-of-the-year smallmouth bass (YOY SMB) according to studies performed by USGS, when the juveniles are particularly vulnerable to stresses from high water temperatures (T°) and low dissolved oxygen (DO). During July in particular, water temperatures frequently exceed biological thresholds established by USGS studies and Pennsylvania Chapter 93 Water Quality Standards, and low river flows contribute to stresses to aquatic life.

Although mussels may experience stress during flows lower than 1,300 cfs as more areas become dewatered, the recommended August threshold was set at 1,200 cfs, the monthly flow corresponding to approximately a 90 percent exceedance (P90) value. The IFIM study indicated that the rate of negative impact to aquatic life increases significantly at and below the flow rate of 1,200 cfs in August.

In months where temperature and dissolved oxygen concentrations are less important factors for aquatic life, the recommended passby requirements are based on the 95 percent flow exceedance for that month. For the months of November through April, passby requirements are not warranted and thus not recommended.

ADDITIONAL CONSIDERATIONS

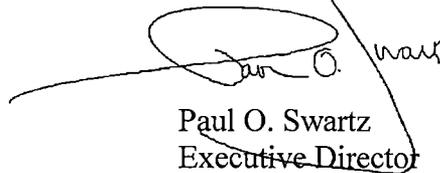
The recommendations herein represent staff's evaluation of the project at this time. Please note that the project is subject to Commission regulations and policies in effect at the time of Commission action. Other caveats include the following:

1. These recommendations are subject to revision based on changes to state and federal requirements, including but not limited to Pennsylvania Chapter 93 Water Quality Standards currently undergoing review and the addition of any additional state or federally listed aquatic species.
2. All additional scientific data available at the time of Commission action will be considered by staff and may result in revisions to these recommendations.
3. Any changes or modifications to the project, including a change to a different energy source, will require additional review that could result in revisions to these recommendations.
4. Any recommendations by Commission staff are not binding on the Commission.
5. Recommendations herein are not transferable in the event of a sale or other transfer of the project.
6. Consistent with past policy and practice, the Commission will incorporate the special conditions in the Pennsylvania Department of Environmental Protection's 401 Water Quality Certification into its recommendations when it acts on these applications.

7. Staff's recommendations were developed assuming that PPL mitigates SSES at 7Q10 events. Additional/more frequent mitigation for that facility could serve to lessen the impacts of BBNPP, and thus result in revised recommendations.
8. Changes to the Commission's consumptive use mitigation requirements or revisions to policies and regulations could cause the Commission to modify recommended passby thresholds.
9. PPL may propose operational alternatives, instream modifications, or other mitigative measures in an effort to lessen or obviate the need for passbys at the recommended thresholds. PPL may submit for staff consideration study interpretations demonstrating that partial mitigation will address the impacts expected at the recommended thresholds.
10. Assumptions about upstream water usage, hydrologic statistics, proposed BBNPP operations, or study interpretations are subject to change following consultation with partner agencies and prior to plant operation, and thus result in modified passby thresholds.

Should you have any questions regarding the review process, or if Commission staff can assist you in any way, please contact Jim Richenderfer at (717) 238-0423, extension 224.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Paul O. Swartz", is written over a printed name and title. The signature is stylized and includes a large loop at the end.

Paul O. Swartz
Executive Director

cc: Gary Petrewski – PPL Bell Bend, LLC

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Susquehanna River Basin Commission

a water management agency serving the Susquehanna River Watershed



June 27, 2012

Mr. Michael J. Caverly
VP-Financial Nuclear Development
PPL Bell Bend, LLC
Two North Ninth Street
Allentown, PA 18101

Re: Holtwood Hydroelectric Station;
Letter from Dennis Murphy to Andrew D. Dehoff, dated March 9, 2012;
Application to Provide Consumptive Water Use Mitigation

Dear Mr. Caverly:

Susquehanna River Basin Commission (SRBC) staff has reviewed the application for the Holtwood Hydroelectric Station to provide consumptive water use mitigation, and Attachment 2 of the Dennis Murphy letter referenced above (Attachment 2) that modifies the OASIS model to evaluate sources of mitigation for PPL consumptive water use in the Susquehanna River Basin.

Attachment 2 provides for two additional mitigation water sources including 2 million gallons per day (mgd) from Rushton Mine, for which an application has been submitted to the SRBC and is currently under review, and 5 mgd from an unidentified source in the West Branch Susquehanna subbasin. Additionally, 28 mgd of consumptive use for the Bell Bend Nuclear Power Plant (BBNPP) was added to PPL consumptive use mitigation requirements.

SRBC is currently reviewing both surface water and consumptive use applications for BBNPP. Based on our review of PPL's consumptive use mitigation needs, SRBC staff has determined that it cannot recommend approval of operations at Holtwood, as proposed, to meet the mitigation requirement at BBNPP. Holtwood's downstream location would leave approximately 120 river miles unmitigated during designated low flow periods. This does not preclude using operations at Holtwood as potential mitigation for other, more appropriate PPL assets.

SRBC Regulation 18 CFR §806.22(c) provides the SRBC with the sole discretion to determine the acceptable manner of mitigation to be provided by project sponsors. Staff would recommend a negative determination for this mitigation option because it fails to address potential significant, localized adverse impacts associated with operation of BBNPP.

As part of its consumptive water use application for BBNPP, PPL must propose (and the SRBC commissioners must approve) mitigation for its requested consumptive water use of 28 mgd. As you are aware, staff has determined that mitigation for a proposed consumptive use by a new facility of this magnitude and at this location must be in the form of flow augmentation or discontinuance of use during designated low flow periods rather than payment of the mitigation fee, so as to ensure no net reduction of flow in the river during such low flow periods.

Given that discontinuance is not viable, either from an economic or societal standpoint, staff believes flow augmentation is the appropriate mitigation option. It is the responsibility of PPL to demonstrate that a mitigation source or combination of mitigation sources meets the objective of minimizing significant adverse impacts to river flows during designated low flow periods. The most effective demonstration that adverse impacts are mitigated is to have the mitigation source(s) located upstream from BBNPP.

From the Corporate Stored Asset Plan (CSAP) approach, mitigation water located upstream of BBNPP that is designated for a specific consumptive use downstream of the confluence of the West Branch and North Branch Susquehanna River could be used for mitigation at BBNPP if: (1) PPL makes the necessary arrangements with the owner of the designated consumptive use mitigation source; (2) the proper quantity of mitigation water is available; (3) the appropriate trigger is established for release of that water for BBNPP mitigation; and (4) the quantity of mitigation water in play is replaced by another source upstream of the designated consumptive use. PPL must provide replacement consumptive use mitigation from the West Branch or some other source that is upstream of the specifically designated consumptive use in order to assure appropriate consumptive use mitigation is restored. This is consistent with our previous correspondence to you on February 16, 2012, outlining requirements for consumptive use mitigation for BBNPP.

SRBC has reviewed Attachment 2 and its description of the application of the OASIS model by PPL for consumptive use mitigation operations at the Holtwood Hydroelectric Station. Our comments are listed below:

1. Whitney Point and Cowanesque releases were excluded by PPL from the "base flow" scenario. By adding the flows back in subsequent scenarios, PPL is claiming credit for those flows which were previously designated for uses other than PPL consumptive assets. The invalid base flow scenario brings into question all subsequent analyses. These operations occur regardless of BBNPP operations, and must be included in the baseline run.
2. The model assumes that Safe Harbor will be operated as "run of river." Safe Harbor is not operated as a run of river unit during low flows. It is operated as a peaking unit. The concern is that, with no minimum releases at Safe Harbor and the large storage capacity at Safe Harbor, the inflows to Holtwood will not be sufficient to maintain the proposed operating regime. For this assumption to be valid, an agreement with Safe Harbor to operate as a run of river facility is required, or the model assessment must demonstrate that the Holtwood facility can sustain a release

absent Safe Harbor releases. If relying on leakage from Safe Harbor, PPL should attempt to validate the suggestion by SRBC staff that approximately 500 cubic feet per second (cfs) routinely leaks from Safe Harbor.

3. PPL has used Whitney Point and the Barnes and Tucker releases in the model as sources for mitigation for PPL assets. This is not a valid assumption because those releases are designated for other consumptive uses, many of which are located upstream of BBNPP, and occur regardless of BBNPP operations. As such, no new augmentation occurs to mitigate the new consumptive losses that would result from BBNPP operations.
4. Trigger flows in the model are based on flows at Harrisburg. This may be inappropriate for PPL consumptive use upstream of Harrisburg. The triggers for existing consumptive use have already been established and should be used in the OASIS model.
5. One of the key results of the February 2012 OASIS runs is that BBNPP consumptive use is offset by the combined flows associated with releases from Cowanesque for the Montour Steam Electric Station (SES) and Three Mile Island (TMI), and low flow augmentation from Whitney Point. As noted above, Whitney Point flows are designated for other uses and should not be attributed to BBNPP consumptive use. Mitigation releases for TMI cannot be used for BBNPP mitigation unless PPL establishes an agreement with TMI for its use, including a new and appropriate trigger for BBNPP, and proposes another acceptable source of mitigation for TMI. An upstream replacement mitigation source for Montour SES must be established for BBNPP to utilize the Cowanesque releases designated for Montour SES. (Please note, any redesignation of Cowanesque storage to any facility other than Montour SES may affect the application of Article 8, Compliance with SRBC Regulations, of the June 1986 Consumptive Use Make-up Agreement executed by PPL and SRBC.)
6. The model inputs by PPL include "average monthly CU" for all PPL consumptive facilities except for BBNPP. To assure the model provides appropriate protection, maximum average monthly consumptive use values should be used.
7. The model inputs include the "maximum simulated full load demand for each month" for BBNPP (23 mgd). The consumptive use requested in the application for BBNPP (28 mgd) should be used.
8. The model included an input to increase the Safe Harbor maximum operating level to EL. 228.0 feet. Absent an agreement with Safe Harbor, this may be an invalid assumption.

If you have any questions regarding the above, please feel free to contact Paula Ballaron at (717) 238-0423, extension 222.

Sincerely,



James L. Richenderfer, Ph.D., P.G.
Director, Technical Programs

cc: Dennis Murphy; PPL
Gary Petrewski; PPL
George Kuczynski; PPL
Michael Canova; USNRC
Laura Quinn-Willingham; USNRC
John Fringer; USNRC
Amy Elliott; USACE, Baltimore District
Kelly Jean Heffner; PADEP
Jason Oyler; PADEP
Thomas Starosta; PADEP
Heidi Biggs; PADEP
J. R. Holtmaster, PADEP
Eugene Trowbridge; PADEP
Mark Hartle; PFBC
Tom Shervinskie; PFBC
Jennifer Kagel; USFWS
Jamie Davis; USEPA