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BELL BEND NUCLEAR POWER PLANT
BBNPP PLOT PLAN CHANGE COLA
SUPPLEMENT, PART 3 (ER); SECTION 6.1
BNP-2011-027 Docket No. 52-039

References: 1) BNP-2010-175, T. L. Harpster (PPL Bell Bend, LLC) to U.S. NRC, "July 2010 BBNPP Schedule Update", dated July 16, 2010

2) BNP-2010-231, R. R. Sgarro (PPL Bell Bend, LLC) to U.S. NRC, "Clarification of Schedule for COLA Part 11 Reports," dated September 10, 2010

3) BNP-2010-246, R. R. Sgarro (PPL Bell Bend, LLC) to U.S. NRC, "BBNPP Plot Plan Change Supplement Schedule Update," dated September 28, 2010

In References 1, 2, and 3, PPL Bell Bend, LLC (PPL) provided the NRC with schedule information related to the intended revision of the Bell Bend Nuclear Power Plant (BBNPP) footprint within the existing project boundary which has been characterized as the Plot Plan Change (PPC). As the NRC staff is aware, the plant footprint relocation will result in changes to the Combined License Application (COLA) and potentially to new and previously responded to Requests for Additional Information (RAIs). PPL declassified this docketed schedule information from regulatory commitment status in Reference 3, with an agreement to update the staff via weekly teleconferences as the project moves forward.

PPL has committed to provide the NRC with COLA supplements, consisting of revised COLA Sections and associated RAI responses/revisions, as they are developed. These COLA supplements will only include the changes related to that particular section of the COLA and will not include all conforming COLA changes. Conforming changes for each supplement necessary for other COLA sections will be integrated into the respective COLA supplements and provided in accordance with the schedule, unless the supplement has already been submitted. In the latter case, the COLA will be updated through the normal internal change process. The revised COLA supplements will also include all other approved changes since the submittal of Revision 2. All COLA supplements and other approved changes will ultimately be incorporated into the next full COLA revision.

The enclosure provides the revised BBNPP COLA Supplement, Part 3 (Environmental Report), Section 6.1, Revision 2b. The revised BBNPP COLA section supersedes previously submitted information in its entirety.

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No open RAIs are associated with the enclosed COLA section. No previously submitted responses to RAIs are affected by the changes shown in the enclosed COLA section. No departures and/or exemptions from the U.S. EPR FSAR for this BBNPP COLA section have been created or revised as a result of the PPC. No new or revised RAI responses are included in this transmittal.

The only new regulatory commitment is to include the revised COLA section (Enclosure) in the next COLA revision.

If you have any questions, please contact the undersigned at 570.802.8102.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on January 25, 2011

Respectfully,

Rocco R. Sgarro

RRS/kw

Enclosure: Revised BBNPP COLA Part 3 (ER); Section 6.1, Revision 2b

cc: (w/o Enclosures)

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Enclosure

Revised BBNPP COLA Part 3 (ER), Section 6.1, Revision 2b

6.1 THERMAL MONITORING

This section presents the pre-application, construction and pre-operational, and operational thermal monitoring programs for the proposed new unit near the existing site of the Susquehanna Steam Electric Station (SSES) Units 1 and 2. The new unit is referred to as Bell Bend Nuclear Power Plant (BBNPP). The objective of thermal monitoring during each phase is to comply with State and Federal water quality criteria and regulations and to protect aquatic life within the area of influence of the BBNPP.

Pertinent BBNPP site and plant features, including boundaries and bathymetry of all water bodies adjacent to the site, are described in Section 2.3.1. The thermal monitoring stations are shown in Figure 6.1-1. Additional information related to field water temperature measurement and data analysis is described in Section 2.3.3. Hydrological and ecological monitoring are described in Section 6.3 and Section 6.5. The extent of the predicted thermal plume is described in Section 5.3.2.1.

Temperature monitoring is described in each subsection below, corresponding with the pre-application, construction and pre-operational, and operational phases of the project. Existing and planned monitoring equipment is similarly described below.

Thermal program acceptance criteria are based on relevant Federal, State, and local requirements. Consultation with the Pennsylvania Department of Environmental Protection (PADEP) has been initiated and will continue throughout pre-application, construction and pre-operational, and operational phases of the project. PADEP will issue the facility a NPDES discharge permit prior to operation.

6.1.1 Preapplication Monitoring

Preapplication thermal monitoring for BBNPP consists of past and present thermal monitoring activities conducted for SSES (PP&L, 1972). SSES Unit 1 began commercial operations in June 1983 and Unit 2 in February 1985. More than 24 years of monitoring activities associated with the existing plant establishes the basis for the thermal description and baseline water temperature conditions for BBNPP.

Data collected prior to the construction of SSES Units 1 and 2 were used to design the cooling water systems to achieve rapid dispersion of effluents and to minimize water temperature variations in the area of plant influence.

Temperature measurements continue to be taken as part of an ongoing water quality monitoring program for the Susquehanna River. Ecology III, Inc. on behalf of SSES Environmental Laboratory records river temperatures on a daily basis at the SSES Environmental Laboratory, and also monitors the cooling water discharge and the river upstream and downstream of the SSES discharge for temperature, among other water quality parameters, on a quarterly basis. Results from the monitoring program are reported in Ecology III, 1987; Ecology III, 1995; Ecology III, 2005; Ecology III, 2007a; Ecology III, 2007b. The locations of the existing temperature monitoring stations are shown on Figure 6.1-1. Bathymetry characteristics adjacent to the existing SSES and proposed BBNPP intake structures and discharge outfalls are described in Section 2.3.1.

The existing SSES plume was determined to have limited downstream temperature impact (Ecology III, 1987). Spring, fall, and winter studies were completed that measured the temperature and downstream extent of the thermal increase. During these studies the maximum increase above ambient temperatures within the plume ranged from 0.5 to 1.0 °F

(0.3 to 0.6 °C) and the plume extent varied from 25 to 130 ft (7.6 to 40 m) downstream from the diffuser pipe. The study indicated that river flow, not discharge temperature increase above ambient, was the most important determinant of the temperature and areal extent of the plume (Ecology III, 1987). SSES is not currently required as a condition of its NPDES permit to monitor the plant's cooling water discharge for temperature.

As discussed in Section 5.3.2.1, modeling of the BBNPP discharge was performed to predict the temperature gradient and downstream extent of the plume. The modeling effort evaluated the maximum possible size of the plume during winter and summer flow scenarios. To accomplish this, summer and winter low and average flow conditions and extreme water temperatures were inputs to the model. The model indicated that within the near-field plume, the discharge temperature decreased quickly to very small values above ambient river temperature due to rapid mixing.

6.1.2 Preoperational Monitoring

Pre-operational thermal monitoring will be a continuation of the pre-application monitoring program. Thermal monitoring data collected during the pre-operational monitoring program will supplement pre-application monitoring data and further serve to establish baseline river water temperature conditions for comparative purposes in assessing potential environmental impact from new plant operations. Preoperational monitoring will be conducted during BBNPP site preparation and construction.

Construction related discharges will consist mainly of drainage that collects in sumps at the bottom of excavations, which will be pumped to a storm water discharge point, storm water associated with construction activities, and hydrostatic test waters. Therefore, no thermal discharges associated with the BBNPP are expected during the preoperational monitoring program.

The PADEP will be notified of pending construction activities and approval of storm water management and erosion/sediment control plans will be obtained in accordance with the NPDES Construction General Permit as described in Section 1.3.

Refer to Section 4.2.1 for anticipated bathymetric characteristics of the Susquehanna River adjacent to the BBNPP site following construction activities.

6.1.3 Operational Monitoring

Thermal monitoring will continue during operation of BBNPP to assess water temperature changes associated with effluents from the new plant.

BBNPP requires water for cooling and operational uses. Cooling water for the turbine condenser and closed cooling heat exchanger for normal plant operating conditions is provided by the Circulating Water System (CWS). The excess heat from the CWS is dissipated to the environment through a closed loop cooling system. A closed loop cooling system recirculates water through the plant components and cools this water for reuse by transferring excess heat to the atmosphere with a cooling tower. The cooling system for BBNPP will be a closed-cycle, wet cooling system, consisting of two natural draft cooling towers for heat dissipation. The existing SSES Units 1 and 2 also use a closed loop cooling system, each with a natural draft cooling tower.

BBNPP will also have four smaller Essential Service Water System (ESWS) cooling towers to dissipate heat from safety-related systems. The ESWS provides cooling water to the

Component Cooling Water System heat exchangers and the cooling jackets of the Emergency Diesel Generators. Makeup water is normally provided to the ESWS cooling towers from the plant Raw Water Supply System (RWSS), but can also be supplied on an emergency basis from the Essential Service Water Emergency Makeup System (ESWEMS) Retention Pond via the ESWEMS makeup water pumps.

Blowdown from the CWS cooling tower and the ESWS cooling towers will collect in ~~a retention basin~~ the Combined Waste Water Retention Pond where some of the water's heat will be released to the atmosphere and surrounding media prior to entering the final discharge pipe. Additional heat will also be transferred to piping and the surrounding environs during its passage to the discharge outfall.

Pennsylvania provides temperature criteria that designate water use and set temperature guidelines for water bodies within the Commonwealth (PA, 2007). The guidelines provide maximum allowable temperatures for critical periods during the year and state that a discharge may not change the temperature of the receiving water body by more than 2 °F (1.1 °C) during a one-hour period.

Based on modeling results of the location of the diffuser discharge, the BBNPP thermal plume is predicted to be similar to the existing SSES thermal plume. Based on its location, the BBNPP plume will likely have limited interaction with the SSES plume. The BBNPP discharge system and the associated characteristics of the associated thermal plume configuration, size, and interaction with SSES are described in greater detail in Section 5.3.2.1. The thermal effects of the BBNPP cooling water discharge will be minimized by the installation of a closed cooling system for BBNPP, as detailed in Section 3.4, due to the reduced output temperature and reduced outfall volume inherent in a closed-cycle system versus a once-through system which will reduce the size and persistence of the thermal plume. Discharge effects have been studied at SSES and provide a basis for assessing the potential ecological impacts of the BBNPP discharge (Ecology III, 1995, 2005, 2007a, 2007b). As discussed in Section 5.3.2.2, the effects of the BBNPP discharge are anticipated to be similar to the SSES discharge. The existing SSES discharge will be used to gauge and evaluate the potential for impacts to result from the BBNPP discharge.

The extent and duration of the operational monitoring program will conform to the requirements of the NPDES permit issued for the new plant, and are expected to be similar to the existing program for SSES. Water temperatures from new plant discharges will meet applicable federal and state environmental regulatory requirements.

6.1.4 References

Ecology III, 1987. Thermal plume studies in the Susquehanna River at the discharge diffuser of the Susquehanna Steam Electric Station, 1986-1987. Prepared for PP&L.

Ecology III, 1995. Environmental Studies in the vicinity of the Susquehanna Steam Electric Station, 1994 Annual Report. Prepared for PPL Susquehanna, LLC.

Ecology III, 2005. Environmental Studies in the vicinity of the Susquehanna Steam Electric Station, 2004 water quality and fishes. Prepared for PPL Susquehanna, LLC.

Ecology III, 2007a. Environmental Studies in the vicinity of the Susquehanna Steam Electric Station, 2005 water quality and fishes. Prepared for PPL Susquehanna, LLC.,

Ecology III, 2007b. Environmental Studies in the vicinity of the Susquehanna Steam Electric Station, 2006 water quality and fishes. Prepared for PPL Susquehanna, LLC., July 2007.

PA, 2007. Pa Code § 93.7, Specific Water Quality Criteria, Amended January 5, 2007, Website: http://www.pacode.com/secure/data/025/chapter93/s93.7.html, Date accessed: May 15, 2008.

PP&L, 1972. Pennsylvania Power and Light Company. Susquehanna Steam Electric Station, Applicant's Environmental Report, Revised, July 1972.

Figure 6.1-1— ~~Existing~~ SSES and ~~Proposed~~ BBNPP Discharge and Temperature Monitoring Stations