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June 30, 2011

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

**BELL BEND NUCLEAR POWER PLANT
RESPONSE TO ENVIRONMENTAL REQUESTS
FOR ADDITIONAL INFORMATION AE 4.3-2, TE 2.4-8,
TE 4.3-4, AND TE 4.3-8 AND SCHEDULE UPDATE FOR
TE 4.3-1, TE 4.3-2, TE 4.3-7, AND TE 4.3-10
BNP-2011-133 Docket No. 52-039**

References:
1) R. R. Sgarro (PPL Bell Bend, LLC) to U.S. Nuclear Regulatory Commission, BNP-2011-010, "Schedule Update for Environmental Requests for Additional Information AE 4.3-2, TE 4.3-1, TE 4.3-2, TE 4.3-4, TE 4.3-7, TE 4.3-8, and TE 4.3-10," dated March 16, 2011

2) R. R. Sgarro (PPL Bell Bend, LLC) to U.S. Nuclear Regulatory Commission, BNP-2011-069, "Schedule Update for Environmental Requests for Additional Information USACE-2, USACE-2a, USACE-2f, USACE-2h, USACE-3, TE 2.4-8, and MET 2.7-1," dated March 30, 2011

3) T. L. Harpster (PPL Bell Bend, LLC) to the Pennsylvania DEP and to the U.S. Army Corps of Engineers, BNP-2011-118, "Joint Permit Application and Request for Water Quality Certification,"dated June 29, 2011

The purpose of this letter is to respond to four Environmental Report (ER) requests for additional information (RAIs): AE 4.3-2, TE 2.4-8, TE 4.3-4, and TE 4.3-8. In addition, this letter revises the schedule for the responses to RAIs TE 4.3-1, TE 4.3-2, TE 4.3-7, and TE 4.3-10. Schedule information for these RAI responses was previously provided by References 1 and 2.

PPL is currently assessing the information developed in support of our recent Joint Permit Application (Reference 3) and the agency requested addition of Martins Creek as an alternative site to produce the final responses to RAIs TE 4.3-1, TE 4.3-2, TE 4.3-7, and TE 4.3-10. We currently believe that we will be able to respond to each of these RAIs on or before October 26, 2011, and will keep you informed of any changes.

This letter creates a new commitment to submit the individual responses to RAIs TE 4.3-1, TE 4.3-2, TE 4.3-7, and TE 4.3-10 by the date identified above.

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If you have any questions, please contact the undersigned at 570-802-8102.

Respectfully,

Rocco R. Sgarro

RRS/kw

Enclosure: Response to Environmental Report (ER) Requests for Additional Information (RAIs): AE 4.3-2, TE 2.4-8, TE 4.3-4, and TE 4.3-8.

cc: (w/ Enclosure)

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Enclosure

Response to Environmental Report (ER) Requests for Additional Information (RAIs):
AE 4.3-2, TE 2.4-8, TE 4.3-4, and TE 4.3-8.

RAI AE 4.3-2

ESRP 4.3.2

Summary: *Provide more detailed information about the relocation of a section of Walker Run, specifically*

• *mapping the locations of the section to be filled, the section to be built, any tributaries that might be affected, and the location of Market Street.*

• *the length of the constructed section versus that of the section that would be filled*

• *the consideration of recent runoff patterns (versus the historic patterns described in ER Section 2) in the redesign of Walker Run and any other waterbodies that would be modified by the proposed actions*

• *the Natural Channel Design method*

• *the potential effects of relocating Walker Run closer to Market Street versus its present location.*

• *Walker Run location and characteristics of the reference channel mentioned on ER Rev 1 page 4-41*

• *the time of year that the stream relocation would occur and its potential effects on recolonization of the new channel*

• *the potential rescue of fish in the section of Walker Run to be relocated*

• *recent runoff patterns being considered in the redesign of Walker Run and any other waterbodies that would be modified by the proposed actions and the ability of the rebuilt Walker Run to handle current or future flows if they are larger than the old ones presented in the ER.*

• *mitigation for each affected stream in accordance with the Corps of Engineers final mitigation rule, published April 10, 2008. http://www.usace.army.mil/CECW/Pages/final_cmr.aspx*

Full Text: The precipitation data presented in the ER are about 28 to 38 years old. Water budgets evaluated for three drainage basins feeding the North Branch of the Susquehanna River were based on data at least 28 years old. Please provide and analyze more recent data.

Response:

Walker Run is not being relocated for the purpose of BBNPP construction. However, there are plans to improve a section of Walker Run for trout habitat. The Walker Run Trout Enhancement Plan may be found in Appendix B of the Joint Permit Application (JPA) transmitted by letter BNP-2011-118, dated June 29, 2011. The Walker Run Mitigation Plans and the Walker Run Design Report may be found in Section R of the JPA transmittal.

COLA Impact:

Section 2.4.2.1.7 of the BBNPP COLA ER will be revised as shown below:

2.4.2.1.7 Habitat Importance

The on-site streams (Walker Run, Unnamed Tributary 5), North Branch Canal, and ponds are typical habitats found throughout eastern Pennsylvania. None of these waterbodies are of regional significance in terms of either unique habitat or utilization by a rare species, although headwaters are important components of stream ecosystems and locally the waters appear to support important ecological functions. Much of the recent scientific literature promotes the protection of headwaters streams and the role they play in determining downstream water quality (Lowe, 2005). Both Walker Run and Unnamed Tributary 5 are important in this respect.

~~Reconstruction of a small section of Walker Run (approximately 1000 ft (305 m)) along the western boundary of the BBNPP site may result in temporary disruption of both benthic and fish community habitat in this section. After re-routing, it is expected that the former community will recolonize the created stream section within a fairly short time frame. The section of stream to be relocated does not follow a natural course and was previously channelized for agricultural purposes. The banks are incised and show signs of extensive erosion. The relocated channel will be west of the existing channel, closer to Market St. The relocated stream channel will be constructed to incorporate natural features of the stream similar to a reference section of Walker Run. The method called Natural Channel Design will be used for the new channel construction. Construction of the new channel will adhere to the PADEP Chapter 105 regulations (PA, 1978). The new channel will be constructed, habitat features added and bank vegetation will be established prior to diverting stream flow into the new channel. The new channel will be constructed with both riffle and pool habitats. Meanders will be created to mimic the reference channel. Rock substrate will be added to the channel to create habitat for benthic macroinvertebrates and fish. The banks will beconstructed to minimize erosion and will be stabilized with native vegetation, and the riparian area will be planted with native vegetation. The restoration goal for the relocated portion of Walker Run is to create habitat in the constructed channel that is similar to the reference condition. Success shall be measured in terms of establishment of fish and benthic macroinvertebrate communities similar to reference sections of Walker Run.~~

Section 2.4.3 of the BBNPP COLA ER will be revised as shown below:

2.4.3 References

~~**PA, 1978.** Pa Code § 105, Criteria For Approval For Construction Or Modification, Amended September 26, 1980, Website: http://www.pacode.com/secure/data/025/chapter105/subchapEtoc.html, Accessed: August 6, 2008.~~

Section 5.2.1.3 of the BBNPP COLA ER will be revised as shown below:

5.2.1.3 Hydrological Alterations

Operational activities that could result in hydrological alterations within the site and vicinity and at offsite areas are described in Section 3.3, 3.4, and 3.7. The principal hydrological alterations on site associated with BBNPP will occur during construction, when one pond (Farm Pond) within the site boundary will be filled ~~and two sections of Walker Run (main stem and Unnamed Tributary No.1) will be filled and re-located~~. In the Canal, temporary cofferdams will be constructed to allow placement of the water intake and discharge lines. Walker Run may also be impacted by either sedimentation or reduced water flow due to measures taken to reduce sedimentation, as described in Section 4.3.2. Once construction is completed, and normal operations begin, it is expected that Walker Run will experience little ongoing impact.

Table 9.2-1 of the BBNPP COLA ER will be revised as shown below (the tabulation below provides only the pertinent excerpt of the table):

Table 9.2-1— Impacts Comparison Table

Impact Category	Proposed Action (BBNPP)
Water Use and Quality	Impact would be SMALL to surficial groundwater from construction activities. These impacts would be localized and water use and quality would be expected to recover during the operations mode. (PPL Susquehanna, LLC, 2006) (NRC, 2008) Impacts to surface water bodies are MODERATE during construction and operation primarily due to loss of wetlands and wetland buffers ~~and the re-routing of the east fork of Walker Run~~. Increased surface water use during operations would be SMALL. (NRC, 2008)

Additional changes to the BBNPP COLA to delete mention of the Walker Run relocation will be incorporated into the associated supplements as the supplements are developed and incorporated.

RAI TE 2.4-8

ESRP 2.4.1

Summary: *Provide a copy of the Rapanos wetlands jurisdiction determination forms or equivalent when completed.*

Full Text: Expected Jurisdictional Determination: Fall 2009

Response:

The Rapanos wetlands jurisdiction determination forms are provided in Appendix A, Item 37 of the Joint Permit Application (JPA) transmitted by letter BNP-2011-118, dated June 29, 2011.

COLA Impact:

The BBNPP COLA will not be revised as a result of this response.

RAI TE 4.3-4

ESRP 4.3.1

Summary: *Provide a discussion of permanent and temporary hydrologic impacts to wetland function for wetland areas that are not being filled.*

Full Text: Review existing and planned hydrological modeling by Rizzo, and discuss impacts from the construction of any ground-water flow barrier (described in ER section 2.3.2.2.11) to wetlands function southwest of the proposed power block location.

Response:

The full text of the RAI above mentions ER Section 2.3.2.2.11. In COLA Rev. 2, this section mentioned that a permanent groundwater barrier would be constructed around the power block area. There was also a sentence that read, "A portion of the wetland areas will be drained and filled in (including the existing pond located 500 ft (152 m) southwest of the center of the reactor)." As a result of the Plot Plan Change, ER Section 2.3.2.2.11, "Site Characteristics for Subsurface Hydrostatic Loading and Dewatering" has been rewritten as identified in the COLA Impact section below. In the new ER Section 2.3.2.2.11, there is no longer mention of the permanent groundwater barrier associated with the power block area and no mention of draining and filling in of wetlands southwest of the reactor.

Section R of the Joint Permit Application (JPA) transmitted by letter BNP-2011-118, dated June 29, 2011, contains a "Construction Dewatering Mitigation Plan" and a "Mitigation Narrative." The Construction Dewatering Mitigation Plan provides information about the BBNPP infrastructure proposed to be constructed in locations which will require dewatering, and the Mitigation Narrative describes the unavoidable remaining impacts and the proposed mitigation projects associated with avoiding wetland and stream features.

COLA Impact:

Section 2.3.2.2.11 of the BBNPP COLA ER will be revised as shown below:

2.3.2.2.11 Site Characteristics for Subsurface Hydrostatic Loading and Dewatering

~~In order to build the power block and other safety-related structures on bedrock, the glacial overburden aquifer must first be excavated and removed. Temporary dewatering will be required for groundwater management during excavation and construction of BBNPP power block foundations. Temporary dewatering is also required for the excavation of the Essential Service Water Emergency Makeup System (ESWEMS) pumphouse. A summary of the groundwater conditions is provided for assessment of de-watering requirements during construction, and for hydrostatic loading on the building foundations once construction is completed and the dewatering pumps are turned off.~~

~~The area of the proposed nuclear island and safety related structures has a current ground elevation ranging from approximately 657 to 669 ft (200 to 204 m) msl. The bedrock surface ranges from 590 up to 675 ft (180 to 206 m) msl beneath the power block area (Figure 2.3-27). The glacial overburden deposits range from 0 to approximately 64 ft (0 to 20 m) thick beneath the power block area. The overburden is thickest beneath geotechnical borings G314 and G323, which are located along the southern side of the power block area. The groundwater elevations in the glacial overburden aquifer in~~

~~this area (e.g., monitoring wells MW301A, MW306A, MW308A, and MW310A) range from 655 to 661 ft (200 to 202 m) msl (Table 2.3-20). In March 2008, the measured groundwater elevations in the southern portion of the power block area (MW308A and MW306A) were at their greatest elevation (approximately 657 ft (200 m) msl). Thus, there is approximately 64 ft (20 m) of saturated sand and gravel deposits that are resting on the bedrock surface in the southern portion of the power block area. The hydraulic conductivity of the glacial overburden materials is relatively large (10 - 200 ft/day (3.1 - 61 m/ day)), so relatively large rates of groundwater seepage into excavations could be encountered.~~

~~In order to excavate down to bedrock surface and construct the foundations in the power block area and the ESWEMS pumphouse, the sand and gravel aquifer needs to first be dewatered in the entire excavation area in order to achieve stable sidewalls and to minimize the area that is disturbed by the excavation. Prior to excavation, a concrete diaphragm wall, slurry wall, or other type of groundwater flow barrier will be constructed around the excavation area. This step will be performed in order to minimize the amount of groundwater that flows into the excavation and minimize the impacts to the shallow glacial aquifer during construction activities. Detailed design drawings and engineering plans for the groundwater flow barrier and construction dewatering system will be developed prior to beginning of any construction activities.~~

~~Some of the groundwater pumped from the excavation will be used for the manufacture of concrete in the concrete batch plant. Some of the extracted groundwater will be used for dust suppression and other construction purposes. None will be used as a source of drinking water. The remainder of the extracted groundwater will be routed to Storm Water Pond No. 1, located immediately west of the power block area (Figure 2.3-4). This pond will retain the water and allow sediment to settle out, prior to discharge to Walker Run. Once construction of power block foundations nears completion, the dewatering wells will be turned off and converted to monitoring wells, if deemed necessary. Otherwise, the dewatering wells will be pressure-grouted shut and abandoned in accordance with PADEP well abandonment requirements.~~

~~The U.S. EPR Final Safety Analysis Report (FSAR) requires that the maximum post-construction groundwater elevation to be at least 3.3 ft (1.0 m) below grade for the nuclear island. The final grade of the nuclear island is designed to be 674 ft (205 m) msl. In 2007 and 2008, groundwater elevations in the glacial overburden aquifer ranged from 656 to 661 ft (200-202 m) msl in the power block area. Therefore, the water-table surface will be approximately 13 ft (4.0 m) or more below the nuclear island ground elevation, based on the current groundwater elevations.~~

~~During construction, the glacial overburden aquifer will be removed throughout most of the power block area. Also, a permanent groundwater barrier will be constructed around the power block area which will limit the flow of groundwater into the area. Large areas will have buildings or pavement over the land surface, which will significantly reduce groundwater recharge from the surface.~~

~~Surface drainage modifications will also affect groundwater recharge and groundwater elevations in the glacial overburden aquifer. A portion of the wetland areas will be drained and filled in (including the existing pond located 500 ft (152 m) southwest of the center of the reactor). Drainage conveyance ditches will be installed to quickly move rainfall and surface water away from the power block area. Unnamed Tributary No.1 originating north of the BBNPP site and flowing along the eastern side of the BBNPP site currently flows westward through the power block area and joins Walker Run. During the early phases of construction, this unnamed tributary of Walker Run will be diverted to the south side of the site (Figure 2.3-4). Walker Run will be re-constructed to a new channel along Market Street, away~~

~~from the power block area. All of these actions are intended to keep surface water away from the power plant area and to minimize groundwater recharge in the area.~~

~~Because of these changes to the drainage system and changes to the land surface (affecting recharge and runoff), the groundwater levels are expected to be lower after construction as compared to the pre-construction groundwater elevations. Therefore, the post-construction potentiometric surface in the glacial overburden aquifer is expected to drop relative to preconstruction groundwater levels. As a result, the post-construction water table surface should be more than 13 ft (4.0 m) below the ground surface.~~

~~The base elevation of the reactor building is designed to be 632.7 ft (192.9 m) msl. Assuming the post-construction water-table surface in the reactor building area was at the same level that currently exists (655-661 ft (200-202 m) msl), the hydrostatic loading on the lower basement walls of the reactor building will be approximately 22 to 28 ft (6.7-8.3 m).~~

~~A permanent groundwater dewatering system will not be needed for the BBNPP facility. Groundwater elevations will continue to be monitored, and any observed deviations in groundwater elevations potentially impacting the current design bases will be accounted for to design a dewatering system, if necessary.~~

The need to dewater prior to and during construction exists in part because the construction of critical safety related structures will require excavation of soil and weathered rock as well as placement of engineered fill beneath foundations. This section will provide descriptions of dewatering activities, explain the impact that site activities will have on groundwater levels during and post-construction, and will also describe the hydrostatic loading anticipated once construction is complete. The final section will discuss post construction dewatering issues and the environmental impacts (if any) that may result.

2.3.2.2.11.1 Dewatering During Construction

During construction activities, three different site areas will be excavated down to competent bedrock. These three areas include:

- the Power Block area,
- the ESWEMS Pond area, and
- the area beneath the Cooling Towers.

During excavation, variable amounts of groundwater will be encountered at each of these three areas. Because the excavation, backfilling, and construction activities need to be performed in dry conditions, temporary groundwater controls will be required during construction. The groundwater elevations will be drawn downward to below the deepest portion of each excavation with dewatering wells and/or sumps. Once construction has been completed in each area, the pumps will be turned off, and groundwater elevations are expected to rebound to levels approximately equal to or slightly lower than the pre-construction groundwater elevations.

The Power Block area is underlain by approximately 10 to 35 feet (3 to 11 m) of silty, sandy glacial till and clayey weathered shale, and 75 to 90 feet (23 to 27 m) of fractured and/or weathered Mahantango Shale. Current groundwater elevations in the bedrock beneath the Power Block area range from approximately 662 to 706 ft (202 to 215 m), with an average groundwater elevation of approximately 688 ft (210 m). Groundwater flow in the shallow bedrock beneath the Power Block area is to the south and southwest. The basal portion of the unconsolidated overburden is saturated; therefore, the overburden will need to be dewatered and stripped off the rock surface prior to excavation into the weathered shale. The excavation will proceed through weathered and/or fractured shale (Figure 2.5-167). The deepest portion of the excavation will be at an elevation of approximately 624 ft (190 m) (Figures 2.5-168 and 2.5-169).

The current anticipated dewatering program will include the installation of dewatering wells around the perimeter of the excavation. Dewatering of the hilltop will commence prior to excavation, and will extend throughout excavation activities in order to maintain dry conditions within the excavation at all times. The dewatering wells may be augmented by or entirely replaced with sumps and sump pumps in the bottom of the excavation. Groundwater elevations in the excavation area will be kept below the floor of the excavation, which means that groundwater elevations will eventually be drawn below 624 ft (190 m). The amount of groundwater that will need to be pumped to keep the excavation dry during construction was estimated using a steady-state, three-dimensional, seven layer, finite-difference groundwater flow model developed using the Visual MODFLOW software package. Based on the results of the modeling, the Power Block dewatering system will need to extract approximately 50 gpm (189 lpm) to keep the excavation dry. The initial pumping rate will need to be slightly higher in the beginning stages of dewatering. The actual required pumping rate will be partially dependent on when the dewatering system is implemented and how fast the excavation proceeds downward.

Groundwater flow in the low topographic areas occurs primarily in the Glacial Outwash (sand and gravel) aquifer. The saturated aquifer thickness is approximately 30 to 55 ft (9 to 17 m) beneath the ESWEMS Pond area. The groundwater elevation in the Glacial Outwash aquifer has ranged from approximately elevation 656 to 664 ft (200 to 202 m) in the vicinity of the ESWEMS Pond during the 2007-2008 and 2010 investigations. Groundwater within this aquifer is generally flowing to the south and southwest toward Walker Run and Tributary No. 1 (see Section 2.3.1.2), and is likely to be the source of a majority of the seepage into the excavation during the construction of the ESWEMS Pond. The saturated thickness of the Glacial Outwash aquifer at this location is approximately 20 ft (6 m) greater than the saturated thickness in the vicinity of the other excavation areas. The excavation in this area will be required to extend down to competent bedrock, which is at a minimum elevation of approximately 612 ft (187 m).

The groundwater model predicts that approximately 920 gpm (3,482 lpm) of groundwater will need to be pumped continuously from the area to keep the ESWEMS Retention Pond excavation dry during construction. Based on the groundwater modeling results, the dewatering effort will likely impact a wetland area immediately northwest of the ESWEMS Pond area and a larger wetland adjacent to Tributary No. 1 (south of the ESWEMS Pond area). The model predicts that groundwater elevations in the Glacial Outwash aquifer (steady-state) could be lowered approximately 15 to 25 ft (4.6 to 7.6 m) in the wetlands immediately northwest of the Pond area and 20 to 35 ft (6 to 11 m) beneath the wetlands adjacent to Tributary No. 1.

In order to reduce the amount of groundwater extraction that will be required during construction of the ESWEMS Pond area, and to minimize the impacts to the wetland areas, a groundwater flow barrier (e.g., soil-bentonite slurry wall) will be installed around the entire ESWEMS Pond area (including the Pumphouse). The flow barrier will greatly reduce the dewatering rate and the number of dewatering wells required to keep the excavation dry. Additionally, the pumping rate required to keep the excavation dry will be as low as 230 gpm (871 lpm) with the use of a flow barrier. The predictive groundwater flow model estimates that during dewatering the drawdown in groundwater elevation beneath the wetlands will be only 5 to 10 ft (1.5 to 3.0 m) with the installation of the flow barrier.

In the vicinity of the cooling towers (i.e., MW303A), the elevation of the groundwater in the Glacial Outwash aquifer has ranged from approximately elevation 712 to 717 ft (217 to 219 m) during the 2007-2008 and 2010 investigations. The cooling towers lie in an area that is at or very near a groundwater divide. As a result, shallow groundwater is flowing both to the east toward Tributary No. 1 and to the west toward Walker Run (Figure 2.3-47 through Figure 2.3-50b). The excavation in the vicinity of the cooling towers will proceed down to competent bedrock; therefore, the excavation will likely intersect the Glacial Outwash aquifer, which would require dewatering. However, in this area, the thickness of the Glacial Outwash aquifer (approximately 24 to 35 ft (7 to 11 m)) is less than in the vicinity of the ESWEMS Pond area, as is its saturated thickness. As a result, a groundwater flow barrier is likely unnecessary for dewatering purposes. According to the groundwater modeling results, a continuous pumping rate of approximately 70 gpm (265 lpm) will be required to keep the excavation in the vicinity of the cooling towers dry during construction.

In order to keep the three excavations dry, a cumulative dewatering rate of approximately 350 gpm (1325 lpm) will be required. This cumulative dewatering rate includes the installation of a flow barrier around the entire ESWEMS Pond and Pumphouse Area. In the vicinity of the ESWEMS Pond and cooling towers, dewatering of the Glacial Outwash aquifer is required; therefore, the majority of dewatering will be achieved with shallow dewatering wells. In the Power Block area, the saturated thickness of the overburden is minimal; therefore, the majority of dewatering may be achieved with sump pumps in the floor of the excavation. The dewatering system design will be developed and finalized closer to the time of construction.

Groundwater extracted by the dewatering system could be routed to the wetlands during construction activities in order to minimize the hydrologic impacts to the wetlands.

RAI TE 4.3-8

ESRP 4.3.1

Summary: *Provide the Section 404 (b)(1) analysis when completed.*

Full Text: None.

Response:

The Section 404 (b)(1) analysis is provided in Section Q, "Alternatives Analysis" of the Joint Permit Application (JPA) transmitted by letter BNP-2011-118, dated June 29, 2011.

COLA Impact:

The BBNPP COLA will not be revised as a result of this response.