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August 27, 2012

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

BELL BEND NUCLEAR POWER PLANT
RESPONSE TO DRAFT ER RAIs
BNP-2012-199 Docket No. 52-039

References: 1) Laura Quinn-Willingham (NRC) to R. R. Sgarro (PPL Bell Bend, LLC), Bell Bend COLA ER, Draft RAIs for the Bell Bend Environmental Review, email dated August 13, 2012

2) BNP-2012-197, R. R. Sgarro (PPL Bell Bend, LLC) to U.S. NRC, "Retransmittal of Responses to RAIs 101 and 106," dated August 20, 2012

The purpose of this letter is to respond to certain Draft Requests for Additional Information (RAIs) provided to PPL by NRC in Reference 1. Enclosure 1 to this letter provides PPL Bell Bend, LLC's (PPL) responses to NRC Draft RAIs as follows:

- GEN-1/GEN-2 addendum
- RHH-1
- RHH-9
- HY-5
- RHH-4
- RHH-10
- MET-5
- RHH-8
- RHH-11

Included in the responses in Enclosure 1 are references to changes to the Bell Bend Nuclear Power Plant Combined License Application (COLA) transmitted to the NRC in response to NRC RAIs 101 and 106, identified in Reference 2.

A disc containing the GEN-1 and GEN-2 addendum graphics files is provided as an Enclosure 2 to this letter.

There are no new regulatory commitments in this letter.

Should you have questions or need additional information, please contact the undersigned at 610.774.7552.

D102
NRO

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

Executed on August 27, 2012.

Respectfully,

Rocco R. Sgarro

RRS/kw

Enclosures: 1) Draft RAI Responses

2) Disc containing GEN-1/GEN-2 graphics files addendum

cc: (w/ Enclosure)

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(w/o Enclosure)

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Enclosure 1

Draft RAI Responses

General (GEN)

Draft RAIs GEN-1 and GEN-2

GEN-1: Provide Figure 4.1-1, in accordance with the list generated by Laura Quinn- Willingham (NRC), Bruce McDowell (PNNL), Nancy Kohn (PNNL), and Dimitri Lutchenkov (AREVA) at the audit.

GEN-2: Provide the GIS layers/shapefiles for:

1. LOCAL_RIVERS_061812

2. LandUse_without_NAI_wetlands _2011Boundary (from Figure 2.2-1).

The NRC also requests GIS data for the alternative site centers.

Response:

A Disc is provided as Enclosure 2 to this letter providing the files requested.

The following table provides the center coordinates for the alternative sites used by PPL to calculate radial distances from the alternative sites for the various analyses completed in support of the BBNPP alternative site analysis.

Alternative Site	Latitude	Longitude	State
Humboldt	40.93408193290	-76.06704536930	PA
Seedco	40.78005650330	-76.50636460220	PA
Montour	41.09255871860	-76.65368811240	PA
Martins Creek	40.79290537970	-75.09954574600	NJ

COLA Impact:

No change to the BBNPP COLA will be made in association with this Draft RAI response.

Hydrology (HY)

Draft RAI HY-5:

Provide clarification of water sources to be used during the construction of Bell Bend. Section 4.2.1.3 of the ER states "the potential sources of water for construction include local municipal water, Susquehanna River water, and offsite water trucked to the construction site."

1) Would "local municipal water" for construction come from the Berwick District of Pennsylvania American Water Company? If not, identify the source(s).

2) What would be source of "offsite water trucked to site"? How long is this expected to be needed?

3) If Susquehanna River water will be used for construction, describe how/where it would be obtained, what it would be used for, how much and for what duration?

Response:

As discussed at the audit, BBNPP will utilize local municipal water for construction provided via the Berwick District of the Pennsylvania American Water Company (PaWC). No water will be trucked to the site to support construction, and no Susquehanna River water will be used for construction.

COLA Impact:

BBNPP COLA ER Sections 4.2, 5.2, 9.3, 10.1, and 10.5 will be revised in a future version of the COLA as shown in the markup on the following pages.

4.2.1.3 Water Sources and Amounts Needed for Construction

Water demand during construction of BBNPP is estimated on work days to ~~average from~~ delivered by pipeline 77,800 gpd (294,000 lpd) to 138,000 gpd (522,000 lpd) during the approximately 68-month construction phase, as described in Section 5.2.1 and Table 5.2-1.

~~Initially, water for construction will be transported on site by trucks and stored onsite in temporary tanks. Once a potable water line is brought to the site, local~~ Local municipal water will be the primary source of water for construction. Table 4.2-1 shows the estimated amounts of fresh water needed by construction year. It is currently estimated that a peak water demand of up to approximately 1,200 gpm (4,500 lpm) will be required for BBNPP construction activities (demands include those for construction personnel, concrete manufacturing, dust control, hydro testing and flushing, and filling tanks and piping). Based on the water demand figures presented in Table 4.2-1 average construction water usage would be less and is estimated at 250 gpm (950 lpm). ~~The potential sources of water for construction include local municipal water, Susquehanna River water, and offsite water trucked to the construction site.~~

4.2.1.4 Surface Water Bodies Receiving Construction Effluents that Could Affect Water Quality

The surface water bodies within the hydrologic system at the BBNPP site that could receive effluents during BBNPP construction are listed in Section 4.2.1.1.

Infiltration beds, several temporary sedimentation basins, and a temporary sedimentation pond are planned to catch stormwater and sediment runoff from the various construction areas. Modeling of the runoff from the probable maximum flood (PMF) during plant operation bounds the possible runoff amounts, characteristics, and impacts that might occur during construction due to unpaved surfaces allowing for greater stormwater infiltration into the ground. The infiltration beds and temporary sedimentation basins will be sized so as to prevent fast-flowing, sediment-laden storm water from reaching Walker Run or the Susquehanna River by allowing peak storm flows to be attenuated and sediments to be removed. The temporary sedimentation basins will comply with the requirements of the NPDES permit and Pennsylvania Erosion and Sediment Control regulations. The flow velocities will be minimized to prevent erosion of the stream banks. The allowable flow rates and physical characteristics of stormwater runoff will be specified in the State discharge permits.

4.2.1.5 Construction Impacts

Construction of BBNPP with its associated cooling towers will impact the glacial outwash aquifer, current Walker Run drainages and impoundments at the BBNPP site. In order to build the power block, the ESWEMS Pond and Pumphouse, and the CWS cooling towers on bedrock, affected portions of the glacial outwash aquifer must first be excavated and removed. Temporary dewatering will be required for groundwater management during excavation and construction of the BBNPP power block and CWS cooling tower foundations. Temporary dewatering is also required for the excavation of the ESWEMS Pond and Pumphouse.

As described in Section 2.3.2, the area of the proposed nuclear island and safety-related structures is located outside of the glacial outwash aquifer and has minimal overlying saturated glacial overburden material. The hydraulic conductivity of the glacial overburden materials is relatively low, so only minimal rates of groundwater seepage into excavations will be encountered. In contrast, the excavations for the CWS cooling towers and, in particular, the ESWEMS Pond and Pumphouse will be located in areas that are intersected by the glacial outwash aquifer and therefore feature a higher potential for groundwater inflow.

Dewatering foundation excavations will also produce localized impacts on the glacial outwash aquifer. However, only temporary impacts to the glacial outwash aquifer are anticipated. The deepest excavations anticipated are for the proposed reactor and auxiliary building foundations, and extend approximately 69 ft (21m) below plant grade (finished grounds surface) in order to reach bedrock. The dewatering system and activities are not expected to have any significant impact on the deeper aquifers. Effluent from the dewatering system will be pumped into on-site impoundments for collection and discharge. Monitoring of construction effluents and stormwater runoff will be performed as required in the stormwater pollution prevention plan, NPDES permit, and other applicable permits obtained for the construction.

The locally lowered glacial outwash aquifer water level would be expected to eventually recover after the dewatering and other subsurface construction activities are complete. Although it would be altered by buildings and paved areas, rainwater will still be allowed to infiltrate through the infiltration beds, which will be designed to maintain post-construction hydrologic conditions as close to preconstruction conditions as reasonably achievable, and in other plant areas with nonimpervious surfaces to recharge the aquifer.

The impact to groundwater is SMALL as changes to the glacial outwash aquifer water level will be temporary and localized and groundwater levels are expected to recover once construction is complete.

4.2.2.4 Water Quantities Available to Other Users

As described in Section 2.3.2.1.2, at present no surface water withdrawals from the Susquehanna River are made in Luzerne County for public potable water supply. The population projection for Act 220 State Water Plan estimates a 7% decline in the Luzerne County population between 2000 and 2030 (PADEP, 2008). Thus, future additional use of surface water is projected to be extremely limited, except for the increase due to BBNPP needs.

Groundwater use and trends in the region of and at the BBNPP site are presented in Section 2.3.2.2 and in Section 2.4.12 of the Final Safety Analysis Report.

Water required for BBNPP construction is estimated at 250 gpm (946 lpm). This water is expected to come from the local public water supply delivered by pipeline. ~~once the line is brought to the site. Prior to the availability of the public water supply, water will be trucked in and stored onsite in temporary tanks.~~

The glacial outwash aquifer is used as a potable water source in the vicinity of the BBNPP site. The SMALL impacts expected from foundation dewatering or other construction activities will not impact any local users.

4.2.2.5 Water Bodies Receiving Construction Effluents

The surface water bodies directly downstream of the proposed construction activities could be impacted during clearing, grubbing, and grading. Locations of surface water and its users that could be impacted by construction activities are provided in Section 4.2.1.4.

Since most of the water for construction would be used for consumptive uses such as grading, soil compaction, dust control, and concrete mixing, little infiltration would be expected. Any effluents that might infiltrate would recharge the glacial outwash aquifer, and, potentially, any underlying aquifer.

4.2.2.6 Baseline Water Quality Data

Baseline water quality data for surface water bodies is provided and discussed in Section 2.3.3. A summary of the water quality data for the onsite surface water bodies is presented in Table 2.3-45. Baseline water quality data for groundwater is provided in Section 2.3.3.

4.2.2.7 Potential Changes to Surface Water and Groundwater Quality

The following section describes the potential water quality impacts resulting from the construction of BBNPP.

The BBNPP site ~~will be~~ provided with water expected to come from the local public water supply delivered by pipeline. ~~once the line is brought to the site. Prior to the availability of the public water supply, water will be trucked in and stored onsite in temporary tanks.~~

Potential Changes to Surface Water Quality

Potential surface water quality impacts are associated with the site clearing and grading activities.

The addition of sediment and organic debris to the local streams resulting from clearing, grubbing, and grading could decrease water quality. Organic debris could dam or clog existing streams, increase sediment deposition, and increase potential for future flooding. Organic debris decomposing in streams can cause dissolved oxygen and pH imbalances and subsequent releases of other organic and inorganic compounds from the stream sediments. Sediment laden waters are prone to reduced oxygen levels, algal growth, and increases in pathogens. If heavy metals or chemical compounds spill and/or wash into surface waters, there could be a direct toxicity to aquatic organisms. These potential pollutant releases could impact aquatic species and in turn affect the recreational aspects associated with fishing.

The water bodies downstream of the proposed construction areas could be directly and indirectly affected by construction activities onsite. Construction debris residing on the pads and temporary staging areas could mix with construction wash-down water or stormwater, exit the site via untreated runoff and produce chemical reactions adverse to downstream ecology. Possible contaminants include: sediment, alkaline byproducts from concrete production, concrete sealants, acidic byproducts, heavy metals, nutrients, solvents, and hydrocarbons (fuels, oils, and greases). There could be a high potential for contaminants to mix with site wash-down water or rainwater/precipitation runoff and be washed downstream into surface water bodies existing on the BBNPP site due to the persistent nature of local precipitation. There could also be the potential for spills within the construction areas consisting of fuels, solvents, sealants, paints, or glues. Construction dusts not suppressed could drift outside of the construction zones and contaminate nearby water supplies. If these contaminants enter the surface water bodies unchecked there could be a potential for infiltration and subsequent groundwater contamination.

The impacts to surface water quality downstream of the construction site are small due to the use of BMPs to control dust, runoff, and spills.

All aspects of the construction of BBNPP will comply with NPDES permits and minimize impacts to surface water quality. The project will also be in compliance with Section 401 of the Clean Water Act which requires that every applicant for a federal (Section 404) permit must request state certification that the proposed activities in the Section 404 permit will not violate state water quality standards.

5.2.1.2.1 Surface Water

BBNPP is designed to use the minimum amount of water necessary to ensure safe, long-term operation of the plant. The intake for BBNPP Intake Structure will be located just downstream of the existing intake structure for SSES. The discharge outfall will enter the Susquehanna River downstream of the existing SSES discharge system through a buried pipe that will be connected to an approximately 107 ft (32.6 m) long multi-port diffuser aligned parallel to, and approximately 380 ft (116 m) south of, the existing Susquehanna Plant Units 1 and 2 discharge line with 72 individual 4 in (10.2 cm) diameter ports spaced center to center 18 in (46 cm) apart. The first port will be located approximately 212 ft (64.6 m) offshore, measured perpendicular to the shoreline. Additional details on the intake and discharge systems are presented in Section 3.4. Water withdrawals for the operation of BBNPP are described in detail in Section 3.3.1.

5.2.1.2.1.1 Plant Construction

The primary water demands during construction are concrete mixing and curing, dust control, and potable water. Water for construction will come from the local public water supply delivered by pipeline. ~~once the line is brought to the site. Prior to the availability of the public water supply, water will be trucked in and stored onsite in temporary tanks.~~ Ground water extracted via excavation dewatering will not be used for construction purposes or for drinking water. Estimated average construction water demand on work days may range from 77,800 gpd (294,000 lpd) to 138,000 gpd (522,000 lpd). Construction uses of water are described in more detail in Table 5.2-2.

Construction water use is assumed to be entirely consumptive. Temporary dewatering will be required during excavation of the power block and ESWEMS Pumphouse foundations. This dewatering will have a temporary effect on the ground water supply. Section 4.2 further addresses water-related impacts of plant construction.

5.2.1.2.1.2 Circulating Water System and Essential Service Water System

BBNPP will utilize a closed-loop CWS System. The system will use two hyperbolic natural draft cooling towers for heat dissipation. The cooling tower system requires makeup water to replace that lost to evaporation, drift (entrained in water vapor), and blowdown (water released to regulate the concentration of solids in the circulating water).

Makeup water for the natural draft CWS cooling tower system will be withdrawn from the Susquehanna River. Based on Susquehanna River chemistry, three cycles of concentration were conservatively selected for cooling tower operation. This is consistent with typical cooling tower operation of 3 to 5 cycles of concentration when using surface water makeup. Maximum makeup and blowdown rates occur at this value. As indicated in Section 3.4, makeup water for the CWS will be pumped at a maximum rate of 23,808 gpm (90,113 lpm). At this makeup rate, water lost by evaporation will be approximately 15,872 gpm (60,076 lpm) and blowdown, which first flows to the Combined Waste Water Retention Pond and then is returned to the Susquehanna River will be approximately 7,928 gpm (30,007 lpm). The CWS water balance is affected minimally by cooling tower drift. Maximum drift losses will be less than 0.001% of the circulating water flow (720,000 gpm (2.73 million lpm)). This results in a maximum drift of 8 gpm (30 lpm).

The Essential Service Water System (ESWS), under normal plant operations with two trains operating, will operate at a nominal circulating flow rate of approximately 19,200 gpm (72,672 lpm). Normal Makeup for the ESWS will be withdrawn from the Susquehanna River. As discussed in Section 3.6.1, the ESWS cooling towers are expected to operate with at least three

9.3.2.2.3

45 at Lewisburg, 0.2 mi [0.3 km] downstream from Buffalo Creek, and 7.4 mi [11.9 km] upstream from mouth) is approximately 446 MGD (1,688 mld) (USGS, 2011b). Therefore, the water availability in the West Branch Susquehanna River at low flow exceeds the total water withdrawal at the site by approximately 10 times.

The intake and discharge structures for the Montour site are expected to be similar to those utilized for the existing Montour Power Plant. They consist of a perforated intake pipe extending laterally across a portion of the river and a diffuser pipe discharge also extending into the river. The existing pumping structure is conspicuously elevated based upon local flooding experience.

Hydrologic impacts associated with construction activities could include alteration of the existing watershed surface; disturbance of the ground surface for stockpiles, material storage, and construction of temporary access roads; construction of water intake and discharge structures; construction of cofferdams and storm sewers; construction of structures that might alter shoreline processes; dredging operations; temporary dewatering activities; construction ics; n and ~~sedimentation; changes in groundwater levels related to temporary dewatering activities~~; and possible subsidence resulting from groundwater withdrawals. The extent of any of these possible impacts exceeds the requirements of reconnaissance and has not been determined.

A dedicated water line delivering water from the Pennsylvania American Water Company will be installed to support construction water needs.

~~Appropriate permits would be obtained for the use of groundwater for construction activities.~~ The required quantity of water is anticipated to be similar to the quantity described in ER Section 4.2.2. Proper mitigation and management methods implemented during construction would limit the potential water quantity and quality impacts on surface water and groundwater.

To obtain the water from the West Branch Susquehanna River, new water intake and discharge pipelines would need to be constructed. At the reconnaissance-level of this evaluation, engineering design of the water pipelines to the river has not been performed. However, a conceptual route for the water pipelines would extend northwest from the western border of the Montour site for approximately 6 mi (10 km) and would then travel southwest for a total of approximately 12.3 mi (19.8 km) paralleling a railroad line for the majority of the distance to the West Branch Susquehanna River along an assumed 120-foot (36.6-m) right-of-way (ROW). Impacts associated with construction of the water pipelines are anticipated to be temporary in nature. Table 9.3-12 lists the aggregate impact on water bodies and wetlands that would be affected by riverfront intake features and the construction of a water supply pipeline. Table 9.3-13 and Table 9.3-14 provide additional details on both onsite and offsite impacts to water bodies and wetlands.

Because the Montour site is comparatively remote from its closest suitable water supply, other hydrological impacts could be associated with the creation of a significant impoundment on the site to assure plant reliability and for safety as an Ultimate Heat Sink (UHS). A detailed analysis would be required to determine the design of such an impoundment based upon local site geology and hydrology. The reservoir would be designed and configured to avoid interface with the groundwater table. Final design would address soil type and depth to water table. Measures, such as clay liners, would be used as appropriate. Based upon studies performed for an EPR nuclear power plant, an impoundment with a surface area of approximately 6.4 ac (2.6 ha) and a depth of 25 ft (8 m) with sloped sides at a 3:1 horizontal to vertical ratio would be required; however, the actual dimensions would necessarily be

cofferdams and excavation, however, the actual methodology cannot be stated with assurance in the absence of specific site data.

9.3.2.3.3

Hydrologic impacts associated with construction activities could include alteration of the existing watershed surface; disturbance of the ground surface for stockpiles, material storage, and construction of temporary access roads; construction of water intake and discharge structures; construction of cofferdams and storm sewers; construction of structures that might alter shoreline processes; dredging operations; temporary dewatering activities; construction activities contributing to sediment runoff; changes in surface water drainage characteristics; decreases in surface water infiltration (increases of impervious surfaces); increased erosion and sedimentation; changes in groundwater levels related to temporary dewatering activities; and possible subsidence resulting from groundwater withdrawals. ~~Permitted withdrawal of groundwater would be used for construction activities.~~ The required quantity of water is anticipated to be similar to the quantity described in ER Section 4.2.2. Proper mitigation and management methods implemented during construction would limit the potential water quantity and quality impacts on surface water and groundwater.

A dedicated water line delivering water from the Pennsylvania American Water Company will be installed to support construction water needs.

~~design of the water pipelines to the river has not been performed. However, a conceptual~~ route for the water pipelines would extend north from the site for approximately 2 miles crossing Black Creek, turn northwest for approximately 3 miles, and then west and north again to cross the Nescopeck Mountain Ridge. The pipeline would then parallel I-80 and Black Creek north for approximately 1.1 miles until turning northeast and ending at the Main Branch Susquehanna River, approximately 2.5 miles south of the BBNPP water intake/discharge structure. Impacts associated with construction of the water pipelines in a 120 foot (36.6 m) wide, 12.5-mi (20.1-km) long ROW are anticipated to be temporary in nature. Table 9.3-12 lists the aggregate impact on water bodies and wetlands that would be affected by riverfront intake features and the construction of a water supply pipeline. Table 9.3-13 and Table 9.3-14 provide additional details on both onsite and offsite impacts on water bodies and wetlands.

Because the Humboldt site is comparatively remote from its closest suitable water supply, other hydrological impacts could be associated with the creation of a significant impoundment on the site to assure plant reliability and for safety as a UHS. A detailed analysis would be required to determine the design of such an impoundment based upon local site geology and hydrology. The reservoir would be designed and configured to avoid interface with the groundwater table. Final design would address soil type and depth to water table. Measures, such as clay liners, would be used as appropriate. Based upon studies performed for an EPR nuclear power plant, an impoundment with a surface area of approximately 6.4 ac (2.6 ha) and a depth of 25 ft (8 m) with sloped sides at a 3:1 horizontal to vertical ratio would be required; however, the actual dimensions would necessarily be influenced by local geology and hydrology. A pond of these dimensions could be built within the approximately 420-ac (170-ha) proposed new unit footprint.

Construction-related water use impacts would be minimized by implementing BMPs, including erosion, grading, and sediment control measures; stormwater control measures; spill prevention plan; and observance of federal, state, regional, tribal, and local regulations pertaining to nonpoint source discharges. Based on the temporary nature of the construction-related impacts and implementation of BMPs during construction, the overall construction-related water impacts would be SMALL.

construction methodology. The preferred installation methodology would be to utilize cofferdams and excavation at this site. However, the use of dredging and or blasting cannot be ruled out in the absence of a specific location and appropriate site data.

9.3.2.4.3

Hydrologic impacts associated with construction activities could include alteration of the existin
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structu
A dedicated water line delivering water from the Pennsylvania American Water Company will be installed to support construction water needs.
alter shoreline processes; dredging operations; temporary dewatering activities; construction activities contributing to sediment runoff; changes in surface water drainage characteristics; decreases in surface water infiltration (increases of impervious surfaces); increased erosion and sedimentation; changes in groundwater levels related to temporary dewatering activities; and possible subsidence resulting from groundwater withdrawals. ~~Permitted withdrawal of groundwater would be used for construction activities.~~ The required quantity of water is anticipated to be similar to the quantity described in ER Section 4.2.2. Proper mitigation and management methods implemented during construction would limit the potential water quantity and quality impacts on surface water and groundwater.

To obtain the water from the Susquehanna River, new water intake and discharge pipelines would need to be constructed. At the reconnaissance-level of this evaluation, engineering design of the water pipelines to the river has not been performed. However, a conceptual 120 foot (36.6 m) wide, 14.3-mi (23.0-km) long ROW for the water pipelines would extend northeast from the site for approximately 2.8 miles, where it would cross Quaker Run, and then turn northwest for approximately 6.5 miles until it crosses a tributary of Shamokin Creek. The pipeline then runs generally north ending at the Main Branch of the Susquehanna River, approximately 4.3 mi upstream of Danville. Impacts associated with construction of the water pipelines are anticipated to be temporary in nature. Table 9.3-12 lists the aggregate impact on water bodies and wetlands that would be affected by riverfront intake features and the construction of a water supply pipeline. Table 9.3-13 and Table 9.3-14 provide additional details on both onsite and offsite impacts on water bodies and wetlands.

Because the Seedco site is comparatively remote from its closest suitable water supply, other hydrological impacts could be associated with the creation of a significant impoundment on the site to assure plant reliability and for safety as a UHS. A detailed analysis would be required to determine the design of such an impoundment based upon local site geology and hydrology. The reservoir would be designed and configured to avoid interface with the groundwater table. Final design would address soil type and depth to water table. Measures, such as clay liners, would be used as appropriate. Based upon studies performed for an EPR nuclear power plant, an impoundment with a surface area of approximately 6.4 ac (2.6 ha) and a depth of 25 ft (8 m) with sloped sides at a 3:1 horizontal to vertical ratio would be required; however, the actual dimensions would necessarily be influenced by local geology and hydrology. A pond of these dimensions could be built within the approximately 420-ac (170-ha) proposed new unit footprint.

Construction-related water use impacts would be minimized by implementing BMPs, including erosion, grading, and sediment control measures; stormwater control measures; spill prevention plan; and observance of federal, state, regional, tribal, and local regulations pertaining to nonpoint source discharges. Based on the temporary nature of the construction-related impacts and implementation of BMPs during construction, the overall construction-related water impacts would be SMALL.

10.1 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

This section summarizes adverse impacts of BBNPP construction and operation that cannot otherwise be avoided, and for which there may be no practical means of mitigation. Chapter 4 and Chapter 5 provide supporting details.

10.1.1 Unavoidable Adverse Environmental Impacts of Construction

Most construction related environmental impacts can be avoided or minimized through the application of best management construction plans and conformance with applicable Federal, State and Local regulations that protect the environment. BBNPP requires use of a site footprint where permanent structures and roads are located. Construction activities, on the other hand, can be managed in ways that limit long-term loss of habitat and impacts to workers and the public.

Construction impacts and potential mitigation measures are discussed in Section 4.6, and summarized here in Table 10.1-1. Considering the planned mitigation measures, the level of unavoidable adverse impacts from construction is expected to be SMALL.

10.1.2 Unavoidable Adverse Environmental Impacts of Operations

Operational impacts of BBNPP are discussed in Chapter 5. Expected impacts and their mitigation are summarized in Table 10.1-2. Unavoidable impacts are limited to operation of the cooling water systems and the generation of additional non-radioactive and radioactive waste. Actions to minimize these impacts include use of closed-cycle cooling and waste minimization. As a result, the unavoidable adverse impacts of operation are also expected to be SMALL.

10.1.3 Summary of Unavoidable Adverse Environmental Impacts from Construction and Operations

During construction, land disturbance will be contained within an area of approximately 687 ac (278 ha). Post-construction, 357.4 ac (144.6 ha) will be permanently committed to the BBNPP plant and supporting infrastructure. BBNPP will be located near the existing Susquehanna Steam Electric Station (SSES) Units 1 and 2. A new access road will be constructed to support BBNPP construction and will remain in place to support operations. Temporary construction and laydown areas will be restored following construction to reduce the size of the footprint affected during operations. BBNPP will require the construction of a new substation, transmission towers and lines to connect BBNPP to the existing SSES switchyard and a planned 500 kV switchyard to the north of the site. All new transmission facilities and lines will be located within the site property. The use of existing offsite transmission right-of-ways for the BBNPP will eliminate the need for construction of new corridors, further limiting the plant's disturbance of land. In addition, no modifications to existing roads associated with off-site transmission corridors are anticipated. in summary, land impacts will be SMALL.

Protection of surface and subsurface water resources during construction will require limitations on the amount of groundwater withdrawn and the discharge of construction waste waters from dewatering activities. Best management practices will be implemented to limit construction related erosion and sedimentation of surface waters. Construction controls will include use of coffer dams, groundwater flow barriers, spill containment, silt screens, settling basins and dust suppression. Water quality monitoring will be conducted to verify that control measures are adequate. No onsite groundwater will be used during the construction or operation of BBNPP. ~~Initially, most water required for construction will be trucked in, and stored on-site in temporary tanks. Once a potable water line is brought to the site, local~~

Local

municipal water will be the primary source of water for construction. Long-term protection of surface waters will be managed through an Individual NPDES Permit for Discharge of Stormwater Associated with Construction Activities, an Erosion and Sediment Control Plan, and a Post-Construction Stormwater Management (PCSM) Plan.

Certain natural resources on site will be affected including encroachment on surface waters and wetlands. One pond within the footprint of the power block will be eliminated and new stream channels created for portions of an onsite stream. An estimated 1.4 ac (0.6 ha) of wetlands will be permanently lost as a result of construction of BBNPP. Activities within these areas will conform to applicable state and federal regulations to ensure that impacts are limited and controlled. Impacts to aquatic resources are expected to be SMALL given the limited area to be committed to permanent use and the absence of threatened and/or endangered species. While a portion of the land utilized for construction will impact these resources, the fauna and flora found are typical of those that occur in comparable locations and are not otherwise unique to the BBNPP property. Where possible, sensitive onsite resources such as wetlands will be avoided or impacts minimized, and if required, mitigated. There are no significant mineral resources within the BBNPP site.

Construction of permanent BBNPP structures such as the reactor, turbine building and cooling towers will require the removal of a portion of the onsite mixed deciduous forest and fields.

Twenty-four previously recorded architectural resources were located within 1 mi (1.6 km) of the BBNPP project area. Five of these previously recorded architectural resources were situated within the project viewshed (an approximately 0.5 mi/0.8 km radius of the project footprint) and two were also located within the proposed project footprint. In addition, six previously recorded archaeological sites were mapped on the floodplain along the west bank of the Susquehanna River. Phase Ib archaeological survey, Phase II National Register site evaluations and an architectural survey, as well as subsequent consultation with the Pennsylvania State Historic Preservation Office (SHPO), were conducted to identify the presence of archaeological sites and architectural resources within the BBNPP project area and to determine their eligibility for listing in the National Register of Historic Places (NRHP). Phase Ib survey identified 14 archaeological sites and 25 isolated finds within the project area. Phase II investigations were subsequently conducted for eight potentially eligible sites. Based on Phase II results and SHPO consultation six of these sites were concluded not eligible for listing in the NRHP and required no further investigation. One site was concluded to be NRHP eligible, and the SHPO recommended site avoidance or Phase III Data Recovery investigations. Proposed plans are to avoid adverse impacts to this NRHP-eligible site through appropriate site avoidance measures developed in consultation with the SHPO. Phase II evaluation of one site is in progress and the site's NRHP eligibility will be determined upon completion of the study and SHPO consultation. Should this site be concluded NRHP eligible, adverse impacts from the proposed project will be avoided through appropriate site avoidance measures. Architectural survey identified 52 resources within the project viewshed. Based on SHPO consultation three of these resources (including one resource in the project footprint) were concluded to be NRHP eligible. However, the SHPO concluded that proposed project impacts will result in no adverse effect to any of the three NRHP-eligible architectural resources; accordingly, no further investigation of these resources will be conducted. Based on a review of applicable state and federal databases, the results of current cultural resource studies, SHPO consultation, and proposed avoidance of NRHP-eligible archaeological sites, it is concluded that adverse impacts to cultural resources from construction are unlikely and the impact is SMALL.

source is

practices and post-construction stormwater management required under State and Federal regulation.

10.5.1

The principal ~~sources~~ of water for construction ~~include~~ local municipal water~~, Susquehanna River water and offsite water that will be trucked in~~. No onsite groundwater will be used during the construction or operation of BBNPP. It is estimated that water use on work days will average from 77,800 gpd (294,000 lpd) to 138,000 gpd (522,000 lpd). Municipal water provided by the Berwick District of Pennsylvania American Water (PAW) will satisfy domestic needs. PAW obtains its water from groundwater wells located in Berwick, PA.

Impacts on wetlands, surface waters and groundwater resources may result from activities that change flow patterns such as construction of sedimentation impoundments, stream channelization, stormwater runoff and dewatering, or discharge of construction related waste effluents. It is anticipated that 1.4 ac (0.6 ha) of wetlands will be affected by these activities. Environmental controls will conform to applicable regulations and best practices to minimize these effects. Examples include sediment control, stormwater retention, spill prevention, and control of construction debris. Efforts to reclaim areas not occupied by permanent structures or to provide offsetting habitat such as reforestation and constructed wetlands will also be evaluated.

While much of the site has historically experienced alterations to support development such as agriculture, protection of important or otherwise unique terrestrial habitats will be considered in developing the construction plan for BBNPP. Surveys of the site were undertaken to identify sensitive locations and protected species, and efforts made to limit encroachment on these areas. Examples include locations with federally or state designated threatened or endangered species, wetland buffers and contiguous forest areas. While certain state or federal designated faunal species were found onsite or may occur in the site's vicinity, their presence was not found to be unique to areas potentially affected by construction.

Impacts to aquatic organisms found within freshwater ponds and streams on site and within the Susquehanna River may be realized to the extent onsite surface waters are removed, dredging is performed and water quality is affected. A survey of aquatic resources identified that no unique aquatic species occur within the construction zone. The fish communities within the onsite ponds were typical of warm water ponds, dominated by sunfish and catfish species generally considered ubiquitous and found in nearby waters. Walker Run, a free flowing stream, was more typical of a cold water habitat. Aquatic macroinvertebrates on site were dominated by dipteran, mayfly and caddisfly species. A portion of site wetlands will be permanently lost, and while they are considered a sensitive resource, the on-site wetlands are not unique or otherwise distinguishable from other wetlands in the area.

The Susquehanna River is a valuable natural resource in that it sustains active recreational fisheries for several fish species including smallmouth bass, muskellunge, northern pike, walleye and bullhead, among others. The river supports two mussel species listed by the Pennsylvania Natural Diversity Inventory as species of concern, the yellow lampmussel *(Lampsilis cariosa)* and the green floater *(Lasmigona subviridis)*. However, the river is typical of habitats found upstream and downstream of the BBNPP site and otherwise provides no unique or protected habitat. No migratory species have collected in the BBNPP reach of the river. Potential impacts to the Susquehanna River would be associated with construction of the cooling water intake and discharge structures.

Meteorology (MET)

Draft RAI MET-5:

RAI Reply 101 and 106 in BNP-2012-172 dated July 12, 2012 (ML12207A095) indicates that there will be revisions in Section 2.7 of the ER to reflect planned changes to the long- term relative concentration (X/Q) and deposition (D/Q) values for normal radioactive effluent releases to the atmosphere. Provide the revisions to ER Section 2.7 as well as the model input/output files used to estimate the long-term X/Q and D/Q values.

Response:

Enclosure 2 to BNP-2012-197, provided to NRC on August 20, 2012, provides the revisions to ER Section 2.7 requested.

Input/output files from the model used to estimate the long-term X/Q and D/Q values are being prepared for submittal to NRC, and will be available via the electronic reading room and the physical reading rooms at AREVA's Washington state and Washington, D.C. area offices by September 7, 2012 for review by NRC at their convenience. The Input/Output files may also be provided on CD at the NRC's request.

PPL requests that the NRC inform PPL of the names of the individuals proposed to go to the physical reading room to review the calculations, and the proposed date(s) on which the NRC and/or its representatives wish to complete this review.

COLA Impact:

Proposed revisions to a future version of the COLA are included in Enclosure 2 of BNP-2012-197[1].

[1] BNP-2012-197, R. R. Sgarro (PPL Bell Bend, LLC) to U.S. NRC, "Retransmittal of Responses to RAIs 101 and 106," dated August 20, 2012

Radiological Health (RHH)

Draft RAIs RHH-1 and RHH-11:

RHH-1: Update ER Section 4.5 based on the commitment made to formally update the construction worker doses in the response to Bell Bend FSAR RAI 116 as stated in BNP-2012-189. Make available for NRC review the calculation package(s) used to generate the revised doses to construction workers.

RHH-11: Provide the revised analysis, data, and assumptions used to estimate the dose to construction workers assuming a full ISFSI in response to eRAI 6473 (ML12215A070).

Response:

The above-listed Draft RAIs will both be answered in the response to RAI 116, currently scheduled for issuance in October, 2012. Draft RAI RHH-1 requests the ER text changes associated with updating language in the ER on construction worker doses, and this update will be provided as part of the existing commitment associated with RAI 116.

Both Draft RAIs request provision of calculations associated with determination of the dose to construction workers, and these calculations are proposed to be made available to the NRC via the electronic reading room and the physical reading rooms at AREVA's Washington state and Washington, D.C. area offices by September 7, 2012 for review by NRC at their convenience.

PPL requests that the NRC inform PPL of the names of the individuals proposed to go to the physical reading room to review the calculations, and the proposed date(s) on which the NRC and/or its representatives wish to complete this review.

COLA Impact:

Proposed revisions to a future version of the COLA associated with Draft RAIs RHH-1 and RHH-1 will be included in the response to RAI 116.

Draft RAIs RHH-4, RHH-8, RHH-9, RHH-10:

Draft RAI RHH-4: Provide the results of the evaluation of the onsite out-of-plant exposure rates based on data from the 2008-2011 SSES Radioactive Effluent Release Report.

Draft RAI RHH-8: Provide copies of the following calculation packages for review:

- 51-9083400-002 or latest version: Technical Input to COLA ER Section 5.4 "Radiological Impacts for Normal Operations for BBNPP"
- 126-9048674-005 or latest version: USEPR Annual Occupational Dose Estimation
- 126-9070954-002 or latest version: Agricultural Production and Radiological Exposure Pathway Data for BBNPP

Draft RAI RHH-9: Incorporate the revisions to Section 5.4.3.1 in the ER per the commitment in BNP-2012-175 for HY-02 (ML12214A590).

Draft RAI RHH-10: Provide results from the revised offsite dose calculations from gaseous and liquid effluents and direct radiation sources per the commitments in BNP-2012-172 dated July 12, 2012 (ML12207A095).

Response: Enclosure 2 to BNP-2012-197, provided to NRC on August 20, 2012, provides the revisions to ER Section 2.7 requested[2].

COLA Impact:

Proposed revisions to a future version of the COLA are included in Enclosure 2 of BNP-2012-197[3].

[2] BNP-2012-197, R. R. Sgarro (PPL Bell Bend, LLC) to U.S. NRC, "Retransmittal of Responses to RAIs 101 and 106," dated August 20, 2012
[3] ibid

Enclosure 2

GEN-1/GEN-2 supplemental graphics files (provided on disc)