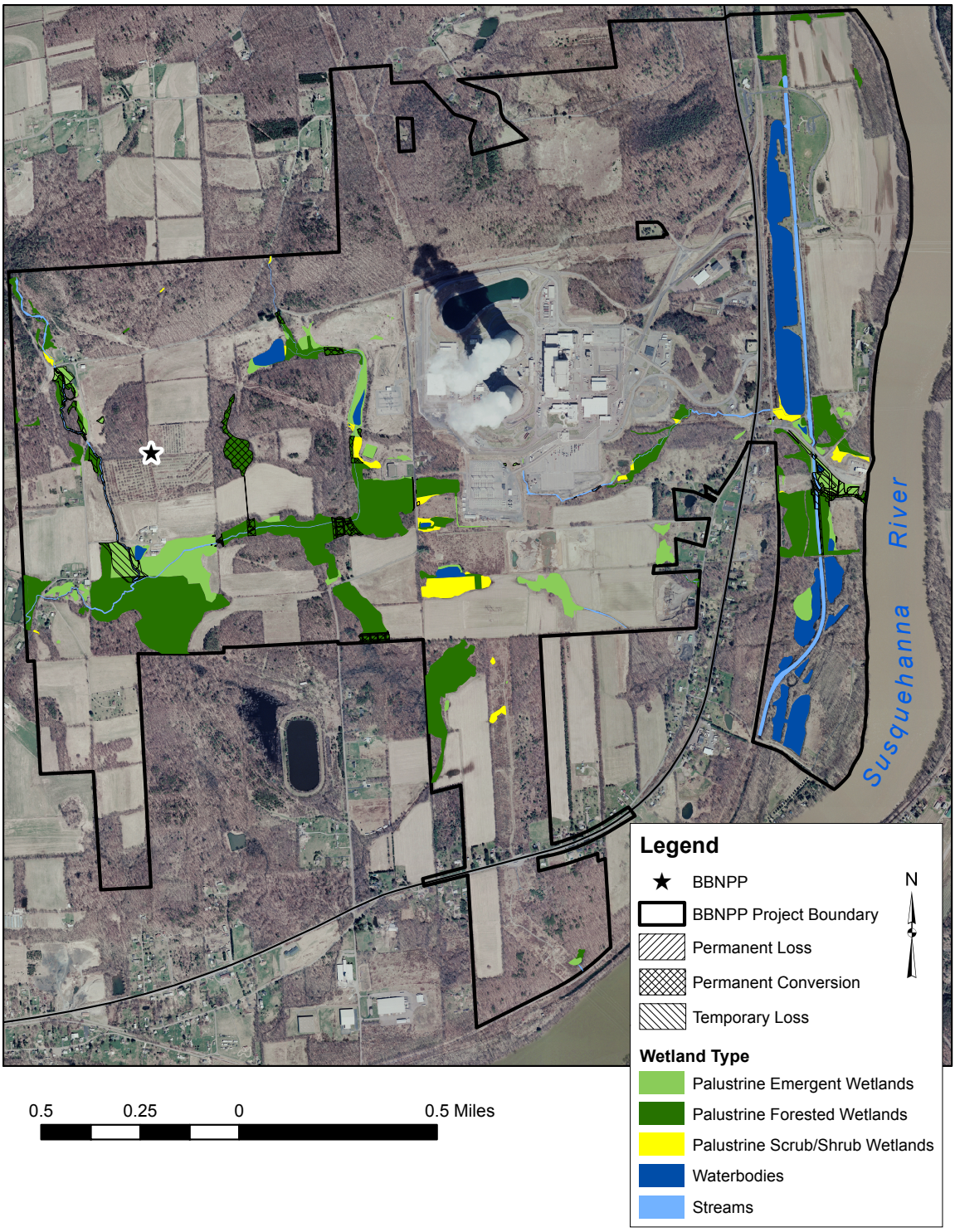
Figure 4.3-3— Wetland Impacts



4.4 SOCIOECONOMIC IMPACTS

4.4.1 Physical Impacts

Construction activities at the BBNPP site will cause temporary and generally localized physical impacts such as increased noise, vehicle exhaust, and dust. This section addresses these potential impacts as they might affect people (the local public and workers), buildings, transportation routes, and the aesthetics of areas located near the plant site.

A description of the BBNPP site, location and surrounding community characteristics is provided in Section 2.1, Section 2.2, and Section 2.5. Chapter 3 describes the proposed facility including its external appearance.

As discussed below, the BBNPP site is located in a rural area, relatively remote from nearby population centers and communities. As a result, the potential for direct physical impacts to the surrounding communities from plant construction is expected to be SMALL.

4.4.1.1 The Public and Workers

People who work at or live near the BBNPPsite will be subject to physical impacts resulting from construction activities. Onsite construction workers will be impacted the most, with workers at the existing adjacent operating units subject to slightly reduced, similar impacts. People living or working adjacent to the site will be impacted significantly less due to site access controls and distance from the construction site where most activities will occur. Transient populations and recreational visitors will be impacted the least for similar reasons and the limited exposure to any impacts of construction.

4.4.1.2 Noise

Section 2.7 provides information and data related to the background noise levels that exist at the construction site.

Noise levels in the site area will increase during construction primarily due to the operation of vehicles; earth moving, materials-handling, and impact equipment; and other tools. Pile driving will occur during some construction activities.

Typical noise levels from equipment that is likely to be used during construction are provided in Table 4.4-1 (Beranek, 1971). Onsite noise levels that workers will be exposed to are controlled through appropriate training, personnel protective equipment, periodic health and safety monitoring, and industry good practices. Good practices such as maintenance of noise limiting devices on vehicles and equipment, and controlling access to high noise areas, duration of emission, or shielding high noise sources near their origin will limit the adverse effects of noise on workers. Non-routine activities with potential to adversely impact noise levels such as blasting will be conducted during weekday business hours and will utilize good industry practices that further limit adverse effects.

The exposure of the public to adverse effects of noise from construction activities will be reduced at the source by many of the same measures described above and the additional distance, interposing terrain, and vegetation which provide noise attenuation. Typically, noise generated by construction equipment decreases by approximately 6 dBA for each doubling of distance (Harris, 1979). For instance, if the maximum noise levels produced by construction are 90 dBA at a reference distance of 50 ft (15 m), then at 100 ft (30 m) that noise level will be reduced to 84 dBA. Because the nearest residence is 220 ft (67 m) away from the limits of disturbance, noise effects from construction are expected to be MODERATE.

Traffic noise in the local area will increase as additional workers commute, and materials and waste are transported to and from the construction site. Noise impacts will occur primarily during shift changes and will not be extraordinary given the source and nature of vehicle noise and the normally varying nature of transient vehicle noise levels. Additionally, localized impacts will be reduced as distance from the construction site increases and traffic diverges outward.

In summary, good noise control practices on the construction site, and the additional attenuation provided by the distance between the public and the site, will limit noise effects to the public and workers during construction so that its impact will be small and temporary. Construction noise generation is directly linked with the conduct of construction activities which will end as the facility enters operation.

4.4.1.3 Dust and Other Air Emissions

Construction activities will result in increased air emissions. Fugitive dust and fine particulate matter will be generated during earth moving and material handling activities. Vehicles and engine-driven equipment (e.g., generators and compressors) will generate combustion product emissions such as carbon monoxide, oxides of nitrogen, and to a lesser extent, sulfur dioxides. Painting, coating and similar operations will also generate emissions from the use of volatile organic compounds (VOCs).

To limit and mitigate releases, emission-specific strategies, plans and measures will be developed and implemented to ensure compliance within the applicable regulatory limits defined by the primary and secondary National Ambient Air Quality Standards in 40 CFR 50 (CFR, 2007a) and the National Emission Standards for Hazardous Air Pollutants in 40 CFR 61 (CFR, 2007b). For example, a dust control program will be incorporated into the Storm Water Pollution Prevention Plan. A routine vehicle and equipment inspection and maintenance program will be established to minimize air pollution emissions. Emissions will be monitored in locations where air emissions could exceed limits (e.g. the concrete batch plant). Air quality and release permits and operating certificates will be secured where required.

The Pennsylvania Department of Labor and Industry (PADOLI) implements occupational health and safety regulations that set limits to protect workers from adverse conditions including emissions of airborne contaminants (PADOLI, 1953). If localized emissions result in limits being exceeded, corrective and protective measures will be implemented to reduce emissions (or otherwise protect workers in some cases) in accordance with the applicable regulations.

Implementation of controls and limits at the source of emissions on the construction site will result in reduction of impacts offsite. For example, the dust control program will limit dust due to construction activities to the extent that it is not expected to reach site boundaries.

Transportation and other offsite activities will result in emissions due largely to use of vehicles. Activities will generally be conducted on improved surfaces and any related fugitive dust emissions will be minimized. As with noise, impacts will be reduced as distance from the site increases.

In summary, air emission impacts from construction are expected to be SMALL because emissions will be controlled at the sources where practicable, maintained within established regulatory limits that were designed to minimize impacts, and distance between the construction site and the public will limit offsite exposures. Construction air emissions impacts

are temporary because they will only occur during the actual use of the specific construction equipment or conduct of specific construction activities, and surfaces will be stabilized upon completion of construction activities.

4.4.1.4 Buildings

The primary buildings in the immediate area with the potential for impact from construction are the residences located 220 ft (67 m) or more to the northwest of the limits of disturbance of the site, and those associated with SSES, which is located approximately 1 mile (1.6 km) to the east. Related information about historic properties and the impacts of construction on them is provided in Section 2.5.3 and Section 4.1.3.

Many existing SSES onsite buildings related to safety of the existing facility were constructed to meet seismic qualification criteria which make them resistant to the effects of vibration and shock similar to that which could occur during construction. Other SSES onsite facilities were constructed to the appropriate building codes and standards which include consideration of seismic loads. Regardless of the applicable design standard, construction activities will be planned, reviewed, and conducted in a manner that ensures no adverse effect on the operating nuclear units and that SSES buildings are adequately protected from adverse impact.

Construction activities are not expected to affect other offsite buildings due to their distance from the construction site.

The impact of construction activities on nearby buildings will be SMALL and temporary because of the design of SSES buildings and the administrative programs that will ensure no adverse interaction with the operating units, while offsite buildings are located at distances that isolate them from potential interaction.

4.4.1.5 Transportation Routes

The major transportation routes in the area are described in Section 2.5.2.

The current Luzerne County highway system contains the major Interstates 80 and 81. Interstate 80, the closest to the proposed plant, runs east-west along the southern end of Luzerne County and is a four-lane divided road built to accommodate large volumes of passenger vehicles and freight transport. These highways provide access to traffic and shipping routes for BBNPP via their intersection with U.S. Highway 11. U.S. Highway 11 is a well maintained two-lane paved road oriented northeast-southwest. Traffic will increase substantially on U.S. Highway 11 during peak construction periods and will be at its greatest during shift changes. Construction workers will use U.S. Highway 11 and Interstates 80 and 81 in the area around the site to commute to work. Additionally, public roadways will be used to transport construction materials and equipment to the site, although most heavy equipment and plant components will be brought in by rail. Impact on area transportation resources will generally decrease with increased distance from the site as various routes are taken by individual vehicles.

A transportation study was performed to identify potential routes, both highway and rail, that could support the shipment of materials for the BBNPP. This study found that significant improvements made to the rail and roadway networks since the 1970's and early 80's are sufficient to ship the necessary construction material(s) to the site. An access road will be built to connect BBNPP with U.S. Highway 11. The existing rail spur will be extended from the existing SSES plant to BBNPP. Use of rail spur during construction is not expected to directly

impact traffic flow on U.S. Highway 11 as there are no at-grade rail crossings along this route in the vicinity of BBNPP and SSES. However, rail deliveries would have the potential to create temporary congestion during SSES shift changes because the rail spur crosses access ways that serve SSES. Measures suggested to avoid these impacts included scheduling shipments over the rail spur to avoid shift changes.

An additional study of traffic related to construction activities (KLD, 2011) was performed to assess the impacts on capacity and level of service (LOS) and to identify potential mitigation actions, if needed. The study found that mitigation will be required to maintain an acceptable level of service on U.S. Highway 11 and at nearby intersections. Table 4.4-2 provides the projected levels of service at key intersections (Figure 4.4-1) during construction of BBNPP as compared to the future no-build traffic condition. Measures suggested to mitigate excess construction traffic impacts include: installation of signals at the entrance to the BBNPP access road; realignment of lanes on U.S. Highway 11 to facilitate entrance to the site; the provision of additional entrance and exit lanes on the access road at the intersection of U.S. Highway 11; and signal retiming, restriping, thru lanes, temporary traffic signals, parking restrictions, and/or other measures at intersections affected by construction traffic. Table 4.4-10 provides a summary of the mitigation measures and the corresponding improvement in level of service.

A water intake pump house along with discharge piping will be constructed for BBNPP. The BBNPP Intake Structure will be located south of the existing SSES plant intake on the west bank of the Susquehanna River. Construction of the intake and discharge will occupy a portion of the river due to construction of sheetpile, but these structures are sufficiently small such that access to upstream and downstream areas by boaters should not be impeded. Furthermore, the cofferdams will be removed prior to operations.

Thus, the potential impacts to the surrounding communities from construction related traffic are expected to be SMALL.

4.4.1.6 Aesthetics

The BBNPP will be separated from the currently operating SSES facilities by a distance of approximately 1 mile (1.6 km). Construction activities that might affect visual aesthetics will largely be limited to those seen from the new construction access road and from Market Street and Beach Grove Road, which pass to the west and north along the perimeter of the site. Some residential properties located west of the site are expected to experience the most direct aesthetic impacts.

As detailed and illustrated in Section 3.1, the proposed building structures that might impact the aesthetic qualities of the area as they reach the tree line during construction are the reactor building, turbine building, and the two natural draft cooling towers. Of the buildings listed, the two cooling towers, at approximately 475 ft (145 m), and the reactor building at approximately 204 ft (62 m), will be the highest structures. Most other new buildings will not be visible because they will be obscured by the taller structures and will generally exist below the tree line.

Visual impacts of construction are expected to be SMALL, because of the topography that includes forests and rolling terrain, and since the BBNPP site is about a 1 mi (1.6 km) from U.S. Highway 11 to the east and south. However, to limit and mitigate aesthetic impacts, the following design and layout concepts will be included:

- Locating plant facilities outside the existing wetland areas and waterbodies and preserving the site's natural hydrology.

- Locating the new intake structure, pump house, and discharge piping near the existing facilities on the river shoreline.
- Minimizing tree removal by locating plant facilities in either cleared fields or lightly forested areas where feasible.
- Transporting excavated and dredged material to an on-site spoils area outside designated wetlands.
- Adding a new access road to provide a direct route to BBNPP and thereby minimizing the impacts to local roads and the disruption of existing traffic patterns from construction and operation of the plant.
- Creating an exterior for new structures that is compatible with the color and texture of the surrounding area.
- Where feasible, replanting and reseeding of cleared areas with native trees and vegetation.

The existing 500 kV transmission system and the PJM Interconnection, LLC, planned upgrades being installed independent of BBNPP construction will serve the offsite needs of BBNPP, requiring no new construction of offsite transmission towers. New transmission towers and transmission lines will be constructed onsite to connect BBNPP to the existing SSES 500 kV switchyard and a new 500 kV switchyard to the north of the site. These new lines will be built on land currently owned by SSES and will be consistent with existing onsite facilities.

In summary, aesthetic impacts are expected to be SMALL and temporary, because the BBNPP site is set back from, and only limited portions of the construction will be visible from, publicly accessible areas. Most construction activities will be shielded from public view and construction activities are by nature temporary.

4.4.1.7 Reference

Beranek, 1971. Noise and Vibration Control, Leo L. Beranek, ed., 1971.

CFR, 2007a. Title 40, Code of Federal Regulations, Part 50, National Primary and Secondary Ambient Air Quality Standards, 2007.

CFR, 2007b. Title 40, Code of Federal Regulations, Part 61, Standards for Performance for New Stationary Sources, 2007.

Harris, 1979. Handbook of Noise Control, 2nd edition, McGraw Hill, 1979.

KLD, 2011. Traffic Impact Study Related to the Proposed Construction and Operation of the Bell Bend Nuclear Power Plant - Preliminary Findings Report, KLD Engineering, P.C., October 2011.

PADOLI, 1953. General Safety Law, Act Number 174 (May 18, 1937), P.L. 654, Pennsylvania Department of Labor and Industry, as amended June 28, 1951 and July 13, 1953.

4.4.2 Social and Economic Impacts

This analysis presents information about the potential impacts to key social and economic characteristics that could arise from the construction of the power plant at the BBNPP site. The

analysis was conducted for the 50 mi (80 km) comparative geographic area and for the region of influence (ROI), Luzerne County and Columbia County, Pennsylvania, where appropriate and as described in Section 2.5.2. The discussion focuses on potential impacts to population settlement patterns, housing, employment and income, tax revenue generation, and public services and facilities.

4.4.2.1 Study Methods

Changes in regional employment can result in impacts to the region's social and economic systems. An estimate of direct full-time equivalent (FTE) personnel that would be needed to construct the new unit was determined and is provided in Table 4.4-3. "Direct" jobs are those new construction employment positions that would be located on the BBNPP site. "Indirect jobs" are positions created off of the BBNPP site as a result of the purchases of construction materials and equipment, and the new direct workers' spending patterns in the ROI. Examples of indirect jobs that could be generated include carpenters and other construction jobs, barbers, restaurant personnel, gas station and auto repairs jobs, convenience store cashiers, dry cleaning and laundry jobs, and so forth.

To estimate indirect employment that would be generated by construction of the power plant, a regional multiplier was generated by the RIMS II software and provided by the Regional Economic Analysis Division of the U. S. Bureau of Economic Analysis (BEA, 2008). This model, based upon the construction industry in the ROI, generated a multiplier of 1.3866 indirect jobs created for each direct job. This multiplier was then applied to the estimated peak number of new direct FTE workers to estimate the peak number of indirect jobs that will be created in the ROI.

This analysis evaluates two potential in-migration impact scenarios for the construction workforce: an assumed 20% of the peak construction workforce moving into the ROI with their families for the duration of construction; and a second scenario with 35% moving into the ROI. These scenarios were selected because they are representative of the range of in-migration levels that the NRC found in studies they conducted in 1981 of nuclear power plant construction workforces. The NRC (NRC, 1981) conducted a study of 28 surveys of construction workforce characteristics for 13 nuclear power plants. They found that 17% to 34% of the total construction workforces at most of these nuclear power plants (the 75th percentile) had moved their families into the study areas for each power plant.

They then conducted a more detailed analysis of in-migrants and found that the most common in-migration levels (again for the 75th percentile) for the construction/labor portion of the workforce ranged from 11% to 29%. Additionally, an analysis of the craft labor portion of the workforce showed that pipefitters, electricians, iron workers, boilermakers, and operating engineers were the most likely non-managerial staff to in-migrate into an area, and general laborers, carpenters, and other types of construction workers were the least likely to in-migrate (NRC, 1981).

For managerial and clerical staff the in-migration levels ranged from 40% to 58%. Of the managerial staff alone (i.e., excluding clerical staff), most sites had in-migration rates of 58% to 76% (NRC, 1981).

The potential demographic, housing, and public services and facilities impacts are only discussed for the two-county region of influence, because those impacts are an integral part of, and derive from the impacts of, the in-migrating construction workforce. Impacts to employment and tax revenues are discussed for the 50 mi (80 km) comparative geographic

area and the ROI, because of the construction labor pool that would be drawn from, and the collection and distribution of income and sales tax revenues throughout, the state.

4.4.2.2 Construction Labor Force Needs, Composition and Estimates

4.4.2.2.1 Labor Force Availability and Potential Composition

There would be an estimated maximum 3,950-FTE person workforce constructing the BBNPP power plant from 2012 to 2018, representing a significant increase in the overall employment opportunities for construction workers. In comparison, Luzerne County had 8,164 construction jobs in 2006 and Columbia County had 2,134 construction jobs (USCB, 2006a). As shown in Table 4.4-3, this peak is estimated to last for about 12 months, from about the third quarter of the fourth year of construction through about the second quarter of the fifth year. Over the course of the entire construction period, staffing needs are estimated to increase relatively steadily from the third quarter of the first year until the peak is reached. Once the peak has passed, the staff levels again would drop steadily until the last 5 months of construction, when employment levels would drop significantly.

Relatively recent studies have shown that the availability of qualified workers to construct the power plant might be an issue, particularly if several nuclear power plants are built concurrently nationwide. Competition for this labor could increase the size of the geographic area, beyond the middle eastern seaboard, from which the direct construction labor force would have to be drawn for BBNPP. In its study of the construction labor pool for nuclear power plants, the U.S. Department of Energy (DOE, 2004a) stated that, "A shortage of qualified labor appears to be a looming problem…The availability of labor for new nuclear power plant construction in the U.S. is a significant concern."

These workforce restrictions are most likely to occur with "managers, who tend to be older and close to retirement, and skilled workers in high-demand, high-tech jobs." The Department of Energy (DOE, 2005) anticipates that qualified boilermakers, pipefitters, electricians, and ironworkers might be in short supply in some local labor markets. Labor force restrictions can be exacerbated by the fact that portions of the labor force might have to have special certifications for the type of work that they are doing, and because they might have to pass NRC background checks (DOE, 2004a). DOE also found that, "recruiting for some nuclear specialists (e.g., health physicists, radiation protection technicians, nuclear QA engineers/ technicians, welders with nuclear certification, etc.) may be more difficult due to the limited number of qualified people within these fields" (DOE, 2004b). However, meeting these needs can be accomplished by hiring traveling crafts workers from other jurisdictions or regions of the country, which is a typical practice in the construction industry.

Estimates about the composition of the BBNPP construction workforce (i.e., types of personnel needed) have not been developed for the power plant. However, existing studies of other nuclear power plant construction sites provide an indication about the potential composition of the BBNPP construction workforce. As shown in Table 4.4-4 (DOE, 2005), during the peak construction period an estimated 67% (2,635) of the construction workforce could be craft labor. Other less prevalent construction personnel could include about 8% (328) of BBNPP's operation and maintenance staff, 7% (265) site indirect labor, and 6% (229) Nuclear Steam Supply System vendor and subcontractor personnel.

In reviewing only the potential craft labor force component of the entire construction workforce as provided in Table 4.4-5 (DOE, 2005), the greatest levels of employment during the peak of construction could be about 18% (474) electricians and instrument fitters, 18% (474) iron workers, 17% (448) pipefitters, 10% (264) carpenters, and 10% (264) of general

laborers. Table 4.4-6 shows the percentage of each of these craft labor categories that would be needed during seven phases of construction. Carpenters, general laborers, and iron workers would comprise the greatest proportions of the workforce during the concrete formwork, rebar installation, and concrete pouring phase of construction. Iron workers would continue to constitute the greatest portion of the workforce during the installation of structural steel and miscellaneous iron work. General laborers and operating engineers would be most needed during the earthwork and clearing of the site, including excavation and backfilling. The installation of mechanical equipment would primarily require pipefitters and millwrights. Pipefitters would also be the primary craft labor category working during installation of piping. Electricians would be the most prevalent during installation of the power plant instrumentation and the electrical systems (GIF, 2005).

As discussed in Section 2.5.2, there were at least 49,179 paid employees in the 50-mile area involved in the construction industry in 2006 (USCB, 2006e). Of this amount, 12,735 were involved in construction of buildings, 4,404 in heavy and civil engineering construction and 31,347 in specialty trades. As detailed in Table 2.5-12, these three categories included a minimum of 377 employees associated with industrial building construction, 1,694 with highway, street and bridge construction, 1,315 with poured concrete structure contractors, 225 with steel and pre-cast concrete contractors, 4,994 with electrical contractors, 7,076 with plumbing and HVAC contractors; and 3,651 with site preparation contractors.

Discussions with labor union representatives in the 50-mile area indicate that, in August 2009, total union worker membership among those union locals providing data was 4,698, including 3,383 electricians and line workers, 600 pipefitters and plumbers, and 715 iron workers. There were a total of 1,374 unemployed union workers, including 603 journey lineman and 409 apprentices/equipment operators, 120 pipefitters and plumbers, and 242 iron workers.

This sector-specific information on construction employment available from the U.S. Census Bureau, which is representative of the 50-mile area, and anecdotal data provided by labor unions within the same region, suggests that a significant portion of the BBNPP construction workforce could potentially be staffed by workers within the 50-mile area.

4.4.2.3 Demography

As state above, it is estimated that a peak of 3,950 FTE employees would be required to construct BBNPP. As shown in Table 4.4-7 under the 20% in-migration scenario, an estimated peak of 688 construction workers would migrate into the ROI along with about 1,018 family members, for a total of 1,706. Of these, the total estimated direct in-migration would be about 829 people (48.6%) into Luzerne County and 878 people (51.4%) into Columbia County. As shown in Table 4.4-8 under the 35% in-migration scenario, an estimated peak of 1,204 direct workers would migrate into the ROI along with about 1,782 family members, for a total of 2,986 people. Of these, the total estimated direct peak in-migration would be about 1,450 people (48.6%) into Luzerne County and 1,536 people (51.4%) into Columbia County.

In addition, it is estimated that a maximum of 954 indirect jobs would be created within the ROI under the 20% scenario and 1,670 indirect workforce jobs would be created under the 35% scenario (multiplying 3,440 ROI peak direct workers by the BEA indirect employment/ economic multiplier of 1.3866, (BEA, 2008)). An estimated 532 to 930 indirect jobs located within the ROI could be filled by the spouses and other family members of the direct workforce. The remaining 423 to 739 indirect jobs likely would be filled by existing unemployed residents, a maximum of 7.0% of the 10,491 unemployed within the ROI in 2006, underemployed area residents, or new in-migrants. If all of these remaining indirect jobs were

filled by new in-migrants, it would only represent 278 to 486 households with 688 to 1,205 people.

A maximum potential in-migration, assuming all indirect workers in-migrate, of up to 2,395 people into the ROI under the 20% scenario, or up to 4,191 people under the 35% scenario, would only represent a 0.6% to 1.1% increase in the total ROI population of 378,034 people in 2006. Table 4.4-9 shows the cumulative workforces that would be accessing the BBNPP site on a daily basis as well as the surrounding ROI during normal SSES operations, planned outages, and construction of the BBNPP facility. Because these percentage changes are small, it is concluded that the impacts to population levels in the ROI would be SMALL, and would not require mitigation.

During the last four years of construction, 363 operations personnel will be on-site. Based upon the existing SSES operational workforce, approximately 87.1 % would in-migrate into the two-county ROI. Approximately 42.3% of the existing SSES operational workforce resides in Luzerne County and 44.8% resides in Columbia County. Therefore, of the 316 workers who would in-migrate, approximately 154 workers and their families would in-migrate into Luzerne County, and 163 workers and their families would in-migrate into Columbia County.

In addition to the direct jobs created by the operational positions, an additional 690 indirect jobs would be created within the ROI (multiplying 363 operational workers by the BEA indirect employment/economic multiplier of 1.9011 (BEA, 2008)). Assuming 244 of the indirect jobs would be filled by the spouses of direct workers as shown in Table 5.8-2, a total of 1,366 people would in-migrate into the ROI as a result of direct and indirect employment. This represents a 0.4% increase on the total population of 378,034 (in 2006).

A search was conducted for the presence of other nuclear power plants within 100 mi (160 km) of the BBNPP site. Figure 4.4-2 shows the resulting locations. The figure contains four overlapping zones each with 50 mi (80 km) radii. The zones include as their centers the surrounding nuclear power plant sites. The other power plants include SSES Units 1 and 2 to the east, Limerick Units 1 and 2 to the southeast, Peach Bottom Units 2 and 3 to the south, and Three Mile Island Unit 1 to the southwest. As can be seen in the figure, the BBNPP site's 50 mi (80 km) radius overlaps slightly with the 50 mi (80 km) zones of each of these facilities. The cumulative effect of a proportion of the construction workforce originating from within 50 mi (80 km) of BBNPP and potentially drawing employees from these other four power plants, or adding significantly to the total employment levels for these types of facilities in these areas, would be SMALL, and would not require mitigation.

4.4.2.4 Housing

The in-migrating construction workforce would likely either rent or purchase existing homes, or would rent apartments and townhouses. Non-migrating (i.e., weekly or monthly) workers would likely stay in area hotels, motels, bed and breakfasts (B&Bs), or at area campgrounds and recreational vehicle (RV) parks. Of the estimated maximum 966 direct and indirect households migrating into the ROI to construct BBNPP under the 20% scenario, and the 1,690 households in the 35% scenario, it is estimated that 429 to 821 households (42%) would reside in Luzerne County and 497 to 869 (45%) would reside in Columbia County. This would represent a maximum of 5.7% to 10.0% of the 16,817 total housing units vacant in the ROI in 2000. It would represent 4.6% to 8.1% of the 20,796 units vacant in 2006. Thus, the ROI, and each county within it, have enough housing units available to meet the needs of the workforce, based upon 2000 and 2006 housing information.

In addition to the construction workforce, 316 operational personnel and their families will in-migrate to the ROI during the last four years of construction. Similar to the construction workforce, the in-migrating operations workers would likely either rent or purchase existing homes, or would rent apartments and townhouses. Of the 550 direct and indirect households migrating into the ROI as calculated in Table 5.8-2, it is estimated that 268 households would reside in Luzerne County and 284 within Columbia County. The total number of housing units needed in the ROI would represent 3.3% of the total 16,817 vacant units located in the ROI in 2000.

An example of what housing impacts could occur is provided by the construction of the original SSES units. Construction of the original SSES units resulted in the modular home developments along Route 93 toward Orangeville, in Salem Township, and in Berwick. Additional development occurred in the Hazleton/Conyngham Valley and the Wilkes-Barre/ Scranton areas. Much of the management and engineering teams moved to the area for relatively long periods of time. More temporary housing that was utilized by some of the construction workforce included motels, located from Benton to Bloomsburg, and camping. In some cases, such as with the members of the electricians union, workers commuted in groups of 12 or more people to the site each day. Many of the pipefitters likely originated and commuted from the Philadelphia area on a weekly basis.

In addition to the above housing units, there are a total of 30 apartment and townhouse complexes providing one to three bedroom rental units in the ROI. Most of these facilities are located in Luzerne County, including 25 apartment and townhouse complexes. These rental complexes could be used to house part of the in-migrating workforce and might be a viable option to purchasing more costly single-family homes.

The ROI contains a total of 9,149 mobile home units. Of this amount, 5,855 are located within Luzerne County and 3,294 are within Columbia County (USCB, 2000b-2000j). The condition of these units is unknown; however, the availability of mobile home units provides an additional opportunity for worker housing within the ROI.

Weekly or monthly commuters might elect to stay at one of the 96 hotels/motels/B&Bs facilities, providing about 3,600 rooms for rent in the ROI. Luzerne County has 49 hotel/motel facilities with 2,300 rooms and Columbia County has 47 facilities with 1,300 rooms. Because the hotels and motels are operating at or near capacity during the summer vacation season, from about April through August (see Section 2.5.2), the portions of the workforce that might want to stay on a weekly or monthly basis and then commute home might compete with existing users. During the remainder of the year, enough units would likely be available to meet the needs of the weekly or monthly commuters.

Because significantly more housing units are available than would be needed, the in-migrating workforce alone should not result in an increase in the demand for housing, or in increases in housing prices or rental rates. Also, construction is not scheduled to begin until 2012, providing adequate time for private developers to construct additional new homes and apartment complexes if the economy in the ROI expands, in general, and demand warrants it. In addition, for about seven months out of the year there are noticeable quantities of vacant motel and hotel units that could be used by weekly and monthly commuters. Thus, because of the available housing, it is concluded that the impacts to area housing would be SMALL, and would not require mitigation.

4.4.2.5 Employment and Income

4.4.2.5.1 50 mi (80 km) Comparative Geographic Area

As stated above, it is estimated that a peak of 3,950 direct construction employees would build BBNPP. Under the 20% peak in-migration scenario described above, it is implicit that the remaining 80% (3,160) either would be commuting from a reasonable distance on a daily basis or would stay at area hotels/motels and would be weekly/monthly commuters to the job site. Under the 35% in-migration scenario, an estimated 65% (2,570) of the peak direct construction workers would be daily or weekly/monthly commuters. The greatest proportion of these workers would likely commute from within or near the Scranton, Pittsburgh, and Philadelphia, Pennsylvania areas; New York, New York metropolitan area; Baltimore, Maryland, and Washington D.C. metropolitan areas. However, a portion of these workers also would likely originate from throughout the northeastern and the remainder of the U.S. The greater the distance that they would commute, and the longer that they are employed on the construction site, the more likely they would be to commute from home on a weekly or monthly basis and stay in area motels, or become in-migrants into the ROI, as described in the housing section above. Because the employment opportunities and income would be spread over the 50 mi (80 km) radius, and an even larger geographic area and basis of comparison outside of the region, the beneficial impacts would be SMALL and would not require mitigation.

4.4.2.5.2 Two-County Region of Influence

Direct construction workforce employment is already discussed in the demography section above. In addition to the 3,950 direct workforce, a peak of 954 indirect workforce jobs would be created in the ROI under the 20% scenario and 1,670 indirect jobs would be created under the 35% scenario (Table 4.4-7 and Table 4.4-8). This would result in a peak increase of 1,642 to 2,874 employed people in the ROI, depending upon the scenario selected. The peak increase in employment would range from 797 to 1,396 people in Luzerne County and 845 to 1,478 people in Columbia County. Unemployed or underemployed members of the labor force could benefit from these increased employment opportunities, to the extent that they have the craft skills required (e.g., laborers, carpenters, electricians, plumbers, welders) and are hired as part of the construction workforce. These increases would result in a noticeable but small impact to the area economy, representing a maximum 0.9% increase in the 151,869 total labor force in Luzerne County in 2000 and 4.6% in the 32,403 total labor force in Columbia County (USCB, 2000).

It is estimated that the direct construction workforce would receive average salaries of $34.00/ hour/worker (two-thirds of the estimated $50 per hour, including benefits), or about $70,720 annually. This would result in an annual salary expenditure, for the peak construction workforce of 3,950 people, of $279.3 million. The average annual salary for the direct workforce would be significantly more than the $52,370 mean earnings in Luzerne County in 2006 and the $48,437 mean earnings in Columbia County. Based upon the peak 35% scenario in-migration levels, Luzerne County would experience an estimated $41.4 million increase in annual income during peak construction and Columbia County would receive an estimated $43.8 million annually. The construction workforce also will have the opportunity to receive overtime pay at a rate of 1.5 times the wage rate for hours over 40 per week. As previously indicated, the average wage rate per hour is $34.00 per hour with an average annual salary of $70,720. This is based on the assumption of a 40 hour work week. The construction workforce has the potential to earn up to 20 hours per week in overtime pay. Over the course of one year, this would amount to an additional 1,040 hours of work. The average rate for overtime pay is

$51.00 per hour. At this rate, a construction worker could earn an additional $53,040, or a total of$123,760 annually.

In addition, the working spouses of the direct construction workers, who filled indirect jobs created by the power plant, would contribute substantially to individual household incomes. Assuming that the average indirect worker earned $17,870, which is the 2006 median of average annual income for service workers in selected occupations in the Scranton-Wilkes Barre MSA (BLS, 2006), the 954 indirect workers under the 20% scenario would generate $17.05 million in additional annual salaries within the ROI, and the 1,670 indirect workers under the 35% scenario would generate $29.8 million in additional annual salaries.

In addition to the direct construction workforce, 316 operational personnel would in-migrate to the ROI during the last four years of construction. This workforce would receive average annual salaries of $77,135 annually, excluding benefits. This would result in an annual salary increase of $24.4 million within the ROI. The average annual salary would be significantly more than the $52,370 mean earnings in Luzerne County in 2006 and the $48,437 mean earnings in Columbia County.

Due to the operational workforce, an additional 690 indirect jobs would be created. Assuming that the average indirect service worker earned $17,870 (the 2006 median of average annual income for service workers in selected occupations in the Scranton-Wilkes Barre MSA) (BLS, 2006) and that 601 indirect workers would reside in the ROI, an additional $10.7 million in annual income would be generated in Columbia and Luzerne Counties.

The additional direct and indirect workforce income would result in additional expenditures and economic activity in the ROI. Construction of SSES was noted to have benefitted restaurants; car dealerships; golf courses/clubs; sand, gravel, and aggregate businesses; firms providing nitrogen and oxygen gases; lumber suppliers; and other similar businesses. Because of the overall significant number of construction and indirect jobs that would be created, existing lower income levels found in the ROI, and the general out-migration occurring (an indicator of lower economic opportunity), the beneficial impacts to employment and income from construction of the BBNPP facility would be MODERATE, and would not require mitigation.

4.4.2.6 Tax Revenue Generation

4.4.2.6.1 50 mi (80 km) Comparative Geographic Area

State income taxes would be generated by the in-migrating residents, although the amount cannot be estimated because of the variability of investment income, retirement contributions, tax deductions taken, applicable tax brackets, and other factors. It is estimated that the 50 mi (80 km) radius and the state, excluding the two county ROI, would experience a $230.7 million increase in annual wages from the direct workforce under the 20% scenario (i.e., 80% of the construction workforce in the 50 mi (80 km) area) and $194.2 million under the 35% scenario (i.e., 65% of the construction workforce in the 50 mi (80 km) area). Relative to the existing total wages for the region and the 50 mi (80 km) radius, it is concluded that the potential increase in state income taxes represent a SMALL economic benefit.

Additional sales taxes also would be generated by the power plant and the in-migrating residents. PPL Bell Bend, LLC, would directly purchase materials, equipment, and outside services, which would generate additional state sales taxes. Also, in-migrating residents would generate additional sales tax revenues from their daily purchases. The amount of increased sales tax revenues generated by the in-migrating residents would depend upon their retail

purchasing patterns, but would only represent a SMALL benefit to this revenue stream for the region and the 50 mi (80 km) radius.

Overall, although all tax revenues generated by the BBNPP and the related workforce would be substantial in absolute dollars, as described above, they would be relatively small compared to the overall tax base in the region and the Commonwealth of Pennsylvania. Thus, it is concluded that the overall beneficial impacts to state tax revenues would be SMALL.

4.4.2.6.2 Two-County Region of Influence

In 2008, PPL Susquehanna, LLC, paid approximately $1.2 million in real estate taxes to Luzerne County for SSES Units 1 and 2 and surrounding properties. PPL Susquehanna, LLC, also paid approximately $2.7 million in real estate taxes to the Berwick School District. In 2008, PPL Bell Bend, LLC, will generate approximately $30,000 in total property taxes in its current, substantially undeveloped state. Based on a countywide property reassessment in 2008, the 2009 real estate taxes are expected to increase significantly on these properties. Additional real estate tax increases are expected once BBNPP secures the approvals for the required rezoning for the properties that will make up the BBNPP site. Taxes will also escalate during the time frame between the commencement of construction and commercial operation of the plant in 2018. Those increases will be based on the reassessed value determined by the County Assessor based on the percentage of work completed. It is anticipated that these reassessments will occur annually until construction is complete, at which time a final assessment will be determined. This total property tax paid during construction will represent a significant increase in revenues for Salem Township, the Berwick Area School District, and Luzerne Country.

These increased property tax revenues would either provide additional revenues for existing public facility and service needs or for new needs generated by the power plant and associated workforce. The increased revenues could also help to maintain or reduce future taxes paid by existing non-project related businesses and residents, to the extent that project-related payments provide tax revenues that exceed the public facility and service needs created by BBNPP. However, the payment of those taxes often lags behind the actual impacts to public facilities and services, or the time needed to plan for and provide the additional facilities or services. Thus, it is concluded that these increased power plant property tax revenues would be a LARGE economic benefit to Luzerne County.

Some additional real estate tax revenue will be generated from the in-migrating population of direct and indirect workers and their families. However, any increase in tax revenues is not expected to be significant, because the existing supply of vacant housing available to meet the needs of the in-migrating workers is anticipated to be adequate. As the existing owners of these housing units likely pay real estate taxes currently, the purchase or rental of these units by in-migrating workers will have little impact on overall real estate tax revenues within the ROI.

Additional state income taxes would be generated by the in-migrating residents. Although the amount cannot be accurately estimated because of the variability of investment income, retirement contributions, tax deductions taken, applicable tax brackets, and other factors, tax revenue data from the Pennsylvania Department of Revenue can be used to project potential tax revenue impacts within the ROI. In 2006, the Commonwealth of Pennsylvania collected $10,261.6 million in income taxes. Based on the 2006 total number of households (4,845,603), this amounts to approximately $2,118 annually per household. As indicated in Table 4.4-7 and Table 4.4-8, a peak of 3,950 direct construction employees will build BBNPP. Under the 20%

in-migration scenario, an estimated 688 workers and their families will locate within the ROI. Based upon this amount, approximately $1,457,184 will be generated annually in income taxes by the 688 households. Under the 35% in-migration scenario, an estimated 1,204 workers and their families will locate within the ROI. Therefore, approximately $2,550,072 will be generated annually in income taxes by the 1204 households.

As with the 50 mi (80 km) comparative geographic area, additional sales taxes also would be generated within the ROI by the power plant and the in-migrating residents. However, these purchases would be much smaller within the ROI. The amount of increased sales tax revenues generated by the in-migrating residents would depend upon their retail purchasing patterns, but would only represent a small benefit to this revenue stream for the Commonwealth of Pennsylvania.The amount of increased sales tax revenues generated by the in-migrating residents would depend upon their retail purchasing patterns, but would only represent a small benefit to this revenue stream for the Commonwealth of Pennsylvania. In 2006-2007, the state collected $8,590.8 million from sales tax (PDR, 2008). Based upon the 2006 total number of households (4,845,603), approximately $1,773 in sales taxes will be generated annually per household (USCB, 2006b and c). As indicated in Table 4.4-7and Table 4.4-8, a peak of 3,950 direct construction employees will build BBNPP. Under the 20% in-migration scenario, an estimated 688 workers and their families are expected to in-migrate into the ROI. Based upon this amount, approximately $1,219,824 in annual sales taxes will be generated by the 688 households. Under the 35% in-migration scenario, an estimated 1,204 workers and their families are expected to in-migrate into the ROI. Therefore, approximately $2,134,692 in annual sales taxes will be generated by the 1,204 households.

Additional income and sales tax also will be generated within the ROI by the 316 in-migrating operational personnel and their families during the last 4 years of construction and 601 indirect workers. Based upon the 2006 state income and sales tax collections, approximately $669,288 in annual income taxes and $560,268 in annual sales taxes will be generated by the in-migrating households of 316 direct workers; and approximately $495,612 in annual income taxes and $405,522 in annual sales taxes will be generated by the 234 households of indirect workers as noted in Table 5.8-2.

It is estimated that Luzerne County will experience a $41.4 million increase in annual wages from the direct construction workforce and $11.6 million from the direct operational workforce. Columbia County would experience an estimated annual increase of $43.8 million from the direct construction workforce and $12.5 million from the direct operational workforce. Relative to the existing total wages for the ROI, it is concluded that the potential increase in income taxes represent a SMALL economic benefit to the jurisdictions.

Overall, although all tax revenues generated by the BBNPP and the related workforce would be substantial, as described above, they would be relatively small compared to the overall tax base in the ROI. Thus, it is concluded that the overall beneficial impacts to tax revenues would be SMALL.

4.4.2.7 Land Values

Studies have found varying impacts to residential and commercial land values for facilities that are visible and have greater perceived risks such as nuclear power plant sites, potentially less visible but also greater perceived risks of contaminated and brownfield sites, highly visible but lower perceived risk sites such as transmission lines, and for highly visible but low perceived human risk sites such as windfarm energy facilities.

Other studies of potential impacts to property values have had varied results, depending on the type of facility being studied, including facilities that are more visible and could have greater risks such as nuclear power plants, facilities that are potentially less visible but also have greater risks such as landfills and hazardous waste sites, and highly visible facilities but with potentially less perceived risk such as electrical transmission lines and windfarm facilities. For instance, a Maryland Department of Natural Resources (MDNR, 2006) study of the effects of large industrial facilities showed that residential property values were not adversely affected by their proximity to the Calvert Cliffs Nuclear Power Plant site. Overall, Maryland power plants have not been observed to have negative impacts on surrounding property values (MDNR, 2006). Similarly, studies of the property value impacts of the Three Mile Island nuclear power plant accident showed that nearby residences were not significantly affected by the accident.

However, studies of the impacts to residential property values from low-level radioactive waste landfills in Ohio, from leaks at a nuclear facility in Ohio, and along potential nuclear shipment routes in Nevada show that these facilities and activities have a negative impact on housing values within a limited distance from the facility, typically within 3 miles. Even within this limited distance, the impacts on property values decrease rather quickly as one gets farther from the facility.

Evaluations of potentially less visible but also perceived greater risk facilities such as hazardous waste and Superfund sites (e.g., underground storage tanks, existing and former manufacturing facilities, and so forth) generally show similar results. A study of underground storage tanks in Ohio showed that proximity to non-leaking or unregistered leaking tanks did not affect property values, but registered leaking tanks affected property values within 300 feet of the sites. Studies of Superfund sites in Ohio, Texas, Pennsylvania, and the southeastern U.S. showed that property values were negatively affected by the facilities. The negative impacts were particularly noticeable during periods with significant media coverage and public concern, with the properties close to the facilities most affected. Again, the greater the distance from the facilities, the less the impacts on property values. Also, once there was a reduction in media attention and public concern, or after site cleanup, property values sometimes recovered from their losses. Similar results were found for landfills in Ohio and Maryland.

Electrical transmission lines and windfarm facilities can be highly visible but might have a smaller perceived risk to area residents than nuclear and hazardous waste facilities. Although three early studies found that tall electrical transmission lines did not affect nearby residential or agricultural property values, later studies showed that they did have a negative effect on property values. The most common reason given by one study was the visual impact of the transmission line, followed by the perceived health risk (Blinder, 1979) (Delaney and Timmons, 1992). One study (Colwell, 1990) showed that over time the negative impacts to property values decreased, indicating a reduced concern about the facilities.

Studies of potential impacts to property values from windfarm facilities have had mixed results. A study of an existing windfarm in New York and a potential windfarm facility in Illinois showed that there was no impact to nearby residential property values. However, another study of impacts at existing facilities showed that property values increased faster near the facilities than in control areas, likely because of the perception that they represented "green" benefits to the environment.

Overall, these studies show that the impacts of various types of facilities can have a negative impact on residential property values, typically within 1 to 3 miles (1.6 to 5 km) of a facility. However, they also show that the impacts might be less where other facilities already exist, and over time these negative impacts could decrease. The three property owners that live within as little as 1,400 feet (426 m) from the proposed BBNPP facility would likely see reduced property values. However, because there is an existing nuclear power plant next to the BBNPP site, it has been there for a number of years, and most residents and recreational users are located 1 mi (1.6 km) or more away from the site, the overall impacts to land values likely would be minimal and not require mitigation. Thus, overall, it is concluded that the impacts to land values would be SMALL, and would not require mitigation.

4.4.2.8 Public Services

The increased population levels could place some additional daily demands on police services, fire suppression and EMS services, constrained medical services, and schools. No impacts would occur to area political and social structures. As shown in Section 2.5.1, population levels in the ROI without the BBNPP project are estimated to decline by 11,928 people from 2000 to 2010, and another 6,727 people from 2010 to 2020, thus somewhat reducing the need for public services. This loss of population would be offset somewhat by the potential total direct and indirect in-migration of 2,395 people into the ROI for the 20% scenario and 4,191 people into the ROI for the 35% scenario for construction of BBNPP, and the potential total direct and indirect in-migration of 1,366 people into the ROI during the last four years of construction due to preliminary commissioning and operational activities. Also, because the addition of BBNPP-related population is so much less than the general projected out-migration of population, there should still be an overall reduced need for public services. Thus, these services should have enough capacity to accommodate the increased demand and impacts would likely be SMALL.

Police

An accepted standard for police officers is 1.5 officers per 1,000 people (Layton and Gloo, 2007). If an additional 2,698 people in-migrate into Luzerne County under the 35% scenario due to the construction of BBNPP and preliminary commissioning and operational activities, the impact would be minimal on law enforcement capacity (rising from the 469.5 officers currently needed to 473.6 with the project). Based upon this standard, Luzerne County had a sufficient number of officers in 2006 because 550 officers were already in the county.

Despite this standard, the Luzerne County Sheriffs Office and 37 other police departments in the county may not have sufficient staff levels to simultaneously respond to a potential emergency and offsite evacuation in the event of an emergency. The departments might need additional funding, staff, facilities, and equipment. For instance, a representative of the Salem Township Police Department suggested that the construction of the BBNPP would require the addition of equipment and response materials particular to the facility. Additional staff may be required, particularly to address traffic concerns.

Columbia County also had a sufficient number of officers in 2006. If an additional 2,858 people in-migrate into Columbia County under the 35% scenario due to the construction of BBNPP and preliminary commissioning and operational activities, the impact would be minimal on the capacity (rising from 97.5 officers currently needed to 101.8 with the project) of the local officers, because the county already has 106 officers.

Existing law enforcement services in Luzerne County and Columbia County appear to be adequate to meet current daily needs within their jurisdictions. As described in Section 4.4.2.6

above, the significant new tax revenues generated in Luzerne County by construction of BBNPP would provide additional funding to expand or improve services and equipment to meet the additional daily demands created by the plant. Columbia County would also experience increased revenues from construction of the power plant, but to a much lesser extent. However, some departments still might not have enough staff and equipment to respond to an emergency situation, including offsite evacuation. Although the BBNPP facility would somewhat increase the need for these services, additional tax funds would be available to pay for these needs. Thus, it is concluded that there would be a SMALL impact on the law enforcement departments and additional mitigation would not be required.

EMS and Fire Suppression Services

In 2005, the United States had a rate of 3.82 firefighters per 1,000 people (Karter, 2006). An accepted standard used for determining the appropriate amount of firefighters within a community is 1 firefighter for every 1,000 people (CCS, 2009).

Luzerne County has 2,391 firefighters and an existing ratio of 7.64 firefighters per 1,000 people. If an additional 2,698 people in-migrate to this county, the number of firefighters needed would be 316, which is far less than the existing number of firefighters. In addition, Columbia County has 967 firefighters and an existing ratio of 14.87 firefighters per 1,000 people. If an additional 2,858 people in-migrate to this county, approximately 68 firefighters would be needed, which is far less than the existing number of active firefighters.

Thus, both jurisdictions appear to be doing an excellent job of meeting the needs of their residents. For instance, a representative from the Salem Township Volunteer Fire Company suggested that the department is able to serve the needs of their residents, but felt that additional volunteers are always needed, regardless of the introduction of new facilities. He also felt that improvements to ensure that the building is capable of handling new types of equipment also are necessary. A representative of the Berwick Fire Department, however, expressed some concerns regarding truck traffic carrying hazardous substances to the site because of an incident that occurred in July of 2008. Construction of the power plant generally would create additional needs beyond those that already exist. In addition, Emergency Management office staff would be affected by having to conduct emergency planning activities for the new power plant.

These fire and emergency response departments would be supplemented by a BBNPP onsite emergency response team, which would include a fire brigade. The BBNPP staff will also include an onsite emergency response team and emergency medical technician (EMT) responders. An emergency management plan will be developed for BBNPP, similar to that which already exists for SSES Units 1 and 2, that would address PPL Bell Bend, LLC and agency responsibilities, reporting procedures, actions to be taken, and other items should an emergency occur at BBNPP.

Similar to police services, the existing fire and emergency medical services in Luzerne County and Columbia County appear to be adequate to meet current daily needs within their jurisdictions. As previously described, the significant new tax revenues generated would provide additional funding to expand or improve services and equipment to meet the additional daily demands created by the plant. Thus, it is concluded that there would be a SMALL impact on the fire and law enforcement departments and additional mitigation would not be required.

Medical Services

As indicated in Section 2.5.2.9.6, the two counties currently have fewer physicians when compared to the state, while Columbia County exceeds the ratio for the number of beds. If 2,698 people in-migrated into Luzerne County during construction, the ratio of physicians would be reduced from 2.52 per 1,000 people to 2.50; and the number of beds would be reduced from 3.11 per 1,000 people to 3.08. An additional nine hospital beds and nine physicians could be needed for the project in-migrating population in Luzerne County to meet the state-wide ratios for Pennsylvania (USCB, 2008).

If 2,858 people in-migrated into Columbia County during construction, the ratio of physicians would be reduced from 1.56 per 1,000 people to 1.49. The number of beds would be reduced from 6.30 per 1,000 people to 6.04. No additional hospital beds and nine additional physicians could be needed for the project in-migrating population in Columbia County to meet the state-wide ratios for Pennsylvania (USCB, 2008).

The in-migrating population to the two-county ROI would have little impact on altering the current ratios. For this reason, the impacts from the construction of the BBNPP would likely be SMALL.

Educational System

As described above, an estimated 469 to 821 new households would in-migrate into Luzerne County for construction of BBNPP. It is estimated that these new households would have a maximum of 259 to 453 children, assuming in-migration of the entire indirect workforce, with most of them likely to be school aged (assuming 0.48 children per household). This would represent an increase of 1.1% to 2.0% in the 42,000 students enrolled in the county during 2005-2006. The increased annual real estate taxes (Section 4.4.2.6.2) that would be paid to Luzerne County and the Berwick Area School district during construction of BBNPP would provide additional funds to meet the educational needs of children for the in-migrating construction workforce. If enrollment levels were to increase as a result of constructing the power plant, the district might seek assistance in recruiting additional teachers and could install modular classrooms. A representative of the Berwick Area School District confirmed that capital investments related to infrastructure might not be needed. Because the percentage increase is not great and additional tax revenues would provide funding to meet new project-related impacts to the school system and the Berwick Area School District, it is estimated that the impacts would be SMALL, and would not require additional mitigation.

The in-migration of an estimated 497 to 869 new households into the Columbia County from construction of the BBNPP could place greater demands on the public school systems of Columbia County. It is estimated that these new households would have a maximum of 274 to 480 children, assuming in-migration of the entire indirect workforce, with most of them likely to be school aged (assuming 0.48 children per household). This would represent an increase of 4.6% to 8.0% in the 10,800 students enrolled in the county during 2005-2006. Although the school district would receive some additional funding from real estate taxes generated by these new households (likely to be minimal because adequate housing units are already available in the county and those units are already being taxed), they would not receive additional funding directly from the power plant, except for the Berwick Area School District, because BBNPP does not pay property taxes to Columbia County.

Therefore, because there would be some additional demands placed on the public school systems of Columbia County, without the benefit of significant additional tax revenue, the impacts of the power plant would be MODERATE. However, any additional mitigation that might be required in County schools, such as the installation of a modular/temporary

classrooms, the renovation or reconfiguration of existing classroom space, or the retention of additional teaching staff, would likely be associated with those communities in closest proximity to BBNPP, which are served primarily by the Berwick Area School District. As discussed in Section 4.4.2.6, the Berwick Area School District, which includes communities located in both Columbia and Luzerne Counties, would receive local tax and revenue benefits from the construction of BBNPP. These additional revenues would be available to the Berwick Area School District to supplement existing sources of funding for operating expenses and capital improvements.

4.4.2.9 Public Facilities

As discussed above, there is a sufficient quantity of vacant housing units in Luzerne County and Columbia County to meet the housing needs of the in-migrating direct construction workforce for BBNPP, so no new housing units would likely be required. The excess capacity in the water and sewage services and the lack of new construction resulting from the power plant would result in no effects to those services. Additional details about water and sewage capacity are provided below. Although an increase in the population would likely place additional demands on area recreational facilities, the facilities appear to have enough capacity to accommodate the increased demand and impacts would likely be SMALL. In the following discussion, additional details are provided about the capacity of the existing recreational facilities. Area highways, roads, and schools would have increased use levels resulting in MODERATE impacts. These impacts are described in Section 4.4.1.

Water

As noted in ER Section 4.4.2.3, approximately 4,191 people would in-migrate into Luzerne and Columbia counties due to plant construction and 1,366 due to preliminary commissioning and operational activities during construction, or a total of 5,557. Each of these individuals would generate an additional need for water. Based upon an approximation of 100 gallons per day (gpd) of water needed per person standard, the estimated in-migrating construction workforce into each of the counties could result in the following additional need for water:

- Luzerne County - 2,698 people would require 269,800 gpd
- Columbia County - 2,858 people would require 285,800 gpd

This would result in a potential total of 555,600 gpd of water needed to meet the needs of the in-migrating construction workforce and their families in the two-county ROI. This amount represents 1.6% of the current total capacity of 34.0 million gpd, as indicated in ER Table 2.5-29 (excluding systems for which design capacity information is not available). As indicated by the representatives from the various authorities, the existing systems should be able to easily provide this additional amount of water.

Sewage

As previously indicated, approximately 5.557 people may in-migrate into Luzerne and Columbia counties during plant construction. Each person has the potential to generate 150 gallons per day of waste water, as indicated in Section 2.5.2.9.2. As a result, the following additional waste water generation could occur:

- Luzerne County - 2,698 people would require 404,700 gpd
- Columbia County - 2,858 people would require 428,700 gpd

This would result in a potential total of 833,400 gpd of waste water generated by the in-migrating construction workforce and their families in the two-county ROI. This amount represents 1.16% of the current total capacity of 71.8429 million gpd, as indicated in ER Table 2.5-31. As indicated by the representatives from the various authorities, the existing systems should be able to treat this additional amount easily.

Recreation

As indicated in Section 2.5.2.6, the existing ratio for state parkland is 58.7 acres per 1,000 people, which is much greater than a suggested standard of 10 acres for every 1,000 people (Williams and Dyke, 1997). If an additional 5,557 people in-migrate to the two-county ROI, this ratio declines slightly to 57.8 acres per 1,000 people. This ratio, however, does not indicate the true capacity of the facilities because county, local, and other open spaces would be available in addition to state parks. According to a Rickett's Glen State Park representative, average annual visitor numbers are approximately 750,000 to 800,000 per year, and the park could easily handle an additional 3,000 people.

4.4.2.10 References

BEA, 2008. Regional Input-Output Modeling System (RIMS II) Economic Multipliers (1997/2005), U.S. Bureau of Economic Analysis, Regional Economic Analysis Division, Website: www.bea.gov/regional/gsp/action.cfm, Date accessed: July 2008.

Blinder, 1979. The Effect of High Voltage Overhead Transmission Lines on Residential Property Values, presented to the Second Symposium on Environmental Concerns in Rights-of-Way, Ann Arbor, Michigan, C. Blinder, October 1979.

BLS, 2006. May 2006 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates, Scranton-Wilkes-Barre, PA, Bureau of Labor Statistics, Website: http://www.bls.gov/oes/2006/may/oes_42540.htm. Date accessed August 3, 2009.

CCS, 2009. Securing a Future of Excellence Together, Central County Safe-T (CCS), Website: http://centralcountysafet.com/5.html, Date accessed: April 14, 2009.

Colwell, 1990. Power Lines and Land Value, The Journal of Real Estate Research (5:1): pgs. 117-127, Peter F. Colwell, 1990.

Delaney and Timmons, 1992. High Voltage Power Lines: Do they Affect Residential Property Values?, The Journal of Real Estate Research 7(3): pgs. 315-329, Charles J. Delaney and Douglas Timmons, 1992.

DOE, 2004a. Study of Construction Technologies and Schedules, O&M Staffing and Cost, Decommissioning Costs and Funding Requirements for Advanced Reactor Designs, Volume 1, U.S. Department of Energy, Prepared by Dominion Energy Inc, Bechtel Power Corporation, TLG Inc, and MPR Associates, May 27, 2004.

DOE, 2004b. DOE NP2010 Construction Schedule Evaluation, MPR-2627, Revision 2, U.S. Department of Energy, L. Crosbie and K. Kidwell, September 24, 2004.

DOE, 2005. DOE NP2010 Nuclear Power Plant Construction Infrastructure Assessment, U.S. Department of Energy.

GIF, 2005. Cost Estimating Guidelines for Generation IV Nuclear Energy Systems, REV.2.02 Final, Generation IV International Forum (GIF), Economic Modeling Working Group (EMWG), September 30, 2005.

Karter, 2006. U.S. Fire Department Profile Through 2005. Fire Analysis and Research Division, Karter, Michael J., National Fire Protection Association, October 2006, Website: http:// www.iafflocal116.org/NFPA_Fire_Dept_Analysis%20page%205.pdf, Date accessed: August 4, 2009.

Layton and Gloo, 2007. Robert Layton and Donald Gloo. Performance Matters, Not a Trivial Exercise, in International Association of City/County Management Magazine. June 2007, Volume 89, Number 5, Website accessed on April 14, 2009, http://icma.org/pm/8905/public/ performance.cfm?author=&title=Performance%20Matters.

MDNR, 2006. Maryland Power Plants and the Environment: A Review of the Impacts of Power Plants and Transmission Lines on Maryland's Natural Resources, Economic Development, Maryland Department of Natural Resources, Power Plant Research Program, January 17, 2006.

NRC, 1981. NUREG/CR-2002, PNL-3757, Volume 2, Migration and Residential Location of Workers at Nuclear Power Plant Construction Sites, Profile Analysis of Worker Surveys, S. Malhotra and D. Manninen, Pacific Northwest Laboratory, Nuclear Regulatory Commission, April, 2007.

PDR, 2008. Commonwealth of Pennsylvania: 2008-2009 Budget in Brief, Pennsylvania Department of Revenue, Website: http://www.portal.state.pa.us/ portal/server.pt? open=512&obj ID=4571 &mode=2#2008-09, Date accessed: August 4, 2009.

USCB, 2000a. U.S. Census Demographic Profiles: 100-Percent and Sample Data, U.S. Census Bureau, Website: http://censtats.census.gov/pub/Profiles.shtml, Date accessed: April 9, 2008.

USCB, 2000b. U.S. Census Bureau. Census 2000 Summary File 3 (SF 3) - Sample Data. DP-4. Profile of Selected Housing Characteristics: 2000. Geographic area: Benton Borough, Pennsylvania. Website accessed on July 16, 2009,www.factfinder.census.gov.

USCB, 2000c.U.S. Census Bureau. Census 2000 Summary File 3 (SF 3) - Sample Data. DP-4. Profile of Selected Housing Characteristics: 2000. Geographic area: Berwick Borough, Pennsylvania. Website accessed on July 16, 2009, www.factfinder.census.gov.

USCB, 2000d.U.S. Census Bureau. Census 2000 Summary File 3 (SF 3) - Sample Data. DP-4. Profile of Selected Housing Characteristics: 2000. Geographic area: Bloomsburg town, Pennsylvania. Website accessed on July 16, 2009, www.factfinder.census.gov.

USCB, 2000e.U.S. Census Bureau. Census 2000 Summary File 3 (SF 3) - Sample Data. DP-4. Profile of Selected Housing Characteristics: 2000. Geographic area: Columbia County, Pennsylvania. Website accessed on July 16, 2009, www.factfinder.census.gov.

USCB, 2000f. U.S. Census Bureau. Census 2000 Summary File 3 (SF 3) - Sample Data. DP-4. Profile of Selected Housing Characteristics: 2000. Geographic area: Hazleton city, Pennsylvania. Website accessed on July 16, 2009, www.factfinder.census.gov.

USCB, 2000g.U.S. Census Bureau. Census 2000 Summary File 3 (SF 3) - Sample Data. DP-4. Profile of Selected Housing Characteristics: 2000. Geographic area: Luzerne County, Pennsylvania. Website accessed on July 16, 2009, www.factfinder.census.gov.

USCB, 2000h.U.S. Census Bureau. Census 2000 Summary File 3 (SF 3) - Sample Data. DP-4. Profile of Selected Housing Characteristics: 2000. Geographic area: Nanticoke city, Pennsylvania. Website accessed on July 16, 2009, www.factfinder.census.gov.

USCB, 2000i. U.S. Census Bureau. Census 2000 Summary File 3 (SF 3) - Sample Data. DP-4. Profile of Selected Housing Characteristics: 2000. Geographic area: Scranton city, Pennsylvania. Website accessed on July 16, 2009, www.factfinder.census.gov.

USCB, 2000j. U.S. Census Bureau. Census 2000 Summary File 3 (SF 3) - Sample Data. DP-4. Profile of Selected Housing Characteristics: 2000. Geographic area: Wilkes-Barre city, Pennsylvania. Website accessed on July 16, 2009, www.factfinder.census.gov.

USCB, 2006. American FactFinder 2006 American Community Survey: Economic Characteristics 2006, U.S. Census Bureau, Website: http://www.factfinder.census.gov.

USCB, 2006a. United States Census Bureau, American FactFinder, Table 4, Selected Statistics by Economic Sector, Sub-Sector, Industry Group, and Industry: 2006. Website accessed on September 4, 2009, http://www.factfinder.census.gov.

USCB, 2006b.ACS Demographic and Housing Estimates: 2006, Pennsylvania, United States Census Bureau, Website: http://factfinder.census. gov/servlet/ADPTable?_bm=y&-state=adp&-context=adp&qr_name=ACS_2006_EST_G00_DP5&-ds_name=ACS_2006_EST_G00_&-tree_id=306&-redoLog=false&-_caller=geoselect&-geo_id=04000US42&-format=&-_lang=en, Date accessed: August 4,2009.

USCB,2006c. Selected Social Characteristics in the United States: 2006. 2006 American Community Survey, Pennsylvania, United States Census Bureau, Website: http://factfinder.census.gov/servlet/ADPTable?_bm=y&-state=adp&-context=adp&-qr_name=ACS_2006_EST_G00_DP2&-ds_name=ACS_2006_EST_G00_&-tree_id=306&-redoLog=false&-_caller=geoselect&-geo_id=04000US42&-format=&-_lang=en, Date accessed: August 4, 2009.

USCB, 2006d.ACS Demographic and Housing Estimates: 2006, Pennsylvania, United States Census Bureau, Website: http://factfinder.census. gov/servlet/ADPTable?_bm=y&-state=adp&-context=adp&-qr_name=ACS_2006_EST_G00_DP5&-ds_name=ACS_2006_EST_G00_&-tree_id=306&-redoLog=true&-_caller=geoselect&-geo_id=05000US42079&-format=&-_lang=en, Date accessed: August 4,2009.

USCB, 2008. United States Census Bureau (USCB), 2008. Table B.6 Counties - Physicians, Community Hospitals, Medicare, Social Security, and Supplemental Security Income. Website accessed on August 13, 2009, http://www.census.gov/prod/2008pubs/07ccdb/tabb6.pdf.

Williams and Dyke, 1997. The New NRPA Guidelines for Open Space: In with the New and Out with the Old Notion of 10 Acres of Park Land for Every 1,000 People, Williams, Richard L.

and Peter T. Dyke, Illinois Periodicals Online Feature Article, March/April 1997, Website: http://www.lib.niu.edu/1997/ip970317.html, Date accessed: August 7, 2009.

4.4.3 Environmental Justice Impacts

This section describes the potential disproportionate adverse socioeconomic, cultural, environmental, and other impacts that construction of BBNPP could have on low income and minority populations within two geographic areas. The first geographic areas is a 50 mi (80 km) radius of the BBNPP power plant, where there is a potential for disproportionate employment, income, and radiological impacts, compared to the general population (NRC, 1999). This analysis also evaluates potential impacts within the region of influence (ROI), most of which is encompassed within a 20 mi (32 km) radius of the power plant site, where more localized potential additional impacts could occur to transportation/traffic, aesthetics, recreation, and other resources, compared to the general population. It also highlights the degree to which each of these populations would disproportionately benefit from construction of the proposed power plant, again compared to the entire population is also discussed.

Section 2.5.1 provides details about the general population characteristics of the study area. Section 2.5.4 provides details about the number and locations of minority and low income populations within a 50 mi (80 km) radius of the BBNPP site, and their related reliance on subsistence uses.

4.4.3.1 Minority and Low Income Populations and Activities

Luzerne County and Columbia County have been defined as the ROI because 87% of the current SSES Units 1 and 2 operational workforce resides there, and it is assumed that the in-migration construction workforce for BBNPP would also primarily reside in and impact this geographic area.

Because the power plant site is currently located on lands owned by SSES, and onsite access to these lands is restricted, no minority or low income residences would be removed or relocated within the ROI. Additionally, the distance of the plant from area residents, in general, is great enough so that these populations would only be affected minimally by construction of the power plant (i.e., noise, air quality, and other disturbances from the footprint of the facility)

4.4.3.1.1 50 Mile (80 km) Comparative Geographic Area

Employment and Income

There would be an estimated maximum 3,950 person workforce constructing the BBNPP power plant from 2012 to 2018, representing a minor increase in the overall employment opportunities for construction workers in: the 50 mi (80 km) comparative geographic area, in which there are a total of 79,804 construction workers in the 22 county area in 2000 (USCB, 2000a); and the state, where a total of 339,363 construction workers were employed in 2000 (USCB, 2000a). Unemployed or underemployed members of minority and low income groups could benefit from increased employment opportunities, to the extent that they have the craft skills required (e.g., laborers, carpenters, electricians, plumbers, welders), are hired as part of the construction workforce, and have adequate transportation to access the construction site.

The greatest concentrations of minority populations within the comparative geographic area, but outside of the ROI, primarily reside toward the edges of the 50 mi (80 km) radius in: Lehigh County (located southeast of the BBNPP site with 54 aggregate minority census blocks); Lycoming County (located west-northwest of the BBNPP site with 8 aggregate groups); and Monroe County (located east of the BBNPP site with 6 aggregate groups). Similarly, the

greatest concentrations of low income populations are located in: Lehigh County (13 census block groups); Lycoming County (9 census block groups); Monroe County (9 census block groups); Lackawanna County (located toward the edge of the 50 mi (80 km) radius northeast of the BBNPP site with 6 census block groups); and Northumberland County (located southwest of the BBNPP site with 5 census block groups) (Section 2.5.4). Given that the peak construction workforce would represent only about 4.9% of the construction workforce in the 50 mi (80 km) radius in 2000, and 1.2% of the construction workforce in the Commonwealth of Pennsylvania, the beneficial impacts of these potential new employment opportunities likely would be SMALL.

In addition, because of the demand for such skills, low income and minority construction workers from the comparative geographic area that are currently employed could realize increased income levels, to the extent that they leave lower paying jobs to work on the BBNPP. As discussed in Section 2.5.2 and Section 4.4.2, the BBNPP construction workforce average annual salary would be about $70,720, compared to the mean earnings of $64,352 in the Commonwealth of Pennsylvania in 2006 (USCB, 2006c). The beneficial impacts of these increased income levels for low income and minority populations likely would be SMALL.

There are no unique minority or low income populations within the comparative geographic area that would likely be disproportionately adversely impacted by the construction of the proposed power plant because they are located more than 20 mi (32 km, or outside of the ROI) from the BBNPP site where no environmental impacts (e.g., noise, air quality, water quality, changes in habitat, aesthetic, etc.) would likely occur.

4.4.3.1.2 Two-County Region of Influence

Employment and Income

Unemployed or underemployed members of minority and low income groups within the ROI also could benefit from increased employment opportunities, to the extent that they have the craft skills required (e.g., laborers, carpenters, electricians, plumbers, welders) and are hired as part of the construction workforce. The beneficial impacts of increased employment opportunities are likely to be more noticeable for minority and low income populations within the ROI, because of the potential hiring levels relative to the smaller existing ROI construction workforce, which would represent 39.0% of the 10,139 construction workforce and 2.1% of the total workforce base of 184,124 employed civilians in the ROI in 2000 (USCB, 2000b) (USCB, 2000c). The minority populations located within the ROI primarily reside in: Wilkes-Barre, which is about 26 mi (42 km) from the BBNPP site; Nanticoke, which is about 16 mi (26 km) from BBNPP site; and Dallas, which is about 24 mi (39 km) from the BBNPP site; and the area located northeast of the BBNPP site on, or just off of, U.S. Highway 11. The low income populations are scattered throughout the Berwick, Bloomsburg, Wilkes-Barre, Nanticoke, and Hazleton areas. Because of the overall significant number of construction jobs that would be created and the general out-migration currently occurring, which is an indicator of lower economic opportunity, the beneficial impacts of these potential new employment opportunities likely would be MODERATE.

In addition, impacts on area businesses, and potentially related increased opportunities to obtain higher paying indirect jobs, could be realized from increased economic activity resulting from BBNPP's purchase of materials from businesses within the ROI. The beneficial impacts of these potential new indirect employment opportunities likely would be SMALL.

As stated in Section 2.5.2 and Section 4.4.2 the BBNPP Construction workforce average annual salary would be about $70,720 compared to the mean earnings of $52,370 in Luzerne County

and $48,437 in Columbia County in 2006 (USCB, 2006a) (USCB, 2006b) and both were significantly less than that for the state or the U.S. Because of the demand for such skills, the proportion of low income and minority construction workers from the ROI that are currently employed could realize increased income levels, to the extent that they leave lower paying jobs to work on the BBNPP. Because of the overall significant number of construction jobs that would be created, lower income levels found in the ROI, and the general out-migration currently occurring, the beneficial impacts of these potential new employment opportunities likely would be MODERATE.

4.4.3.2 Subsistence Activities

The types and levels of subsistence activities occurring in the two-county ROI (i.e., Luzerne County and Columbia County) are described in Section 2.5.4. As discussed in this section, wildlife and fish harvesting are important parts of the food gathering activities for minority and low income residents. Susquehanna River sediments would be disturbed and turbidity would likely increase during construction of the water intake and outfall for the BBNPP. These activities could disturb current subsistence catch rates of resident finfish (e.g., muskellunge, northern pike, walleye, yellow perch, largemouth and smallmouth bass, native brook trout, and other species) to the extent that they are occurring near the BBNPP site. Although these activities could disturb traditional subsistence catch rates of finfish, to the extent that they are occurring on the Susquehanna River near the BBNPP intake and outfall sites, the impacts would likely be SMALL for all members of the general public and, thus, would not represent a disproportionate impact to minority or low income populations.

As stated in Section 4.3.1, white-tail deer, turkey, rabbit, squirrel, waterfowl, and other wildlife populations are abundant throughout Pennsylvania, including those areas in the vicinity of the BBNPP site. These populations represent a valuable resource for hunters. Construction of the BBNPP project might affect habitat for some of these species, but adequate similar habitat should be available in the surrounding area, so that overall population and harvest levels would not be affected.

In addition, it is assumed that collection of plants for ceremonial purposes and as a food source (i.e., culturally significant plants, berries, or other vegetation) could be occurring in the two county region of influence. Again, minority and low income populations might be conducting these collection activities in the vicinity of the BBNPP site, or could be harvesting greater quantities of plants, than the general population.

For safety and security reasons the general public is not allowed uncontrolled access to the BBNPP site. Thus, no ceremonial or subsistence gathering of culturally significant plants, berries, or other vegetation occurs on the site and no impacts would occur.

4.4.3.3 References

NRC, 1999. Standard Review Plans for Environmental Reviews for Nuclear Power Plants, NUREG-1555, Nuclear Regulatory Commission, October 1999.

USCB, 2006a. American FactFinder 2006 American Community Survey: Economic Characteristics 2006, Luzerne County, Pennsylvania, U.S. Census Bureau, Website: www.factfinder.census.gov, Date accessed: April 9, 2008.

USCB, 2006b. American FactFinder 2006 American Community Survey: Economic Characteristics 2006, Columbia County, Pennsylvania, U.S. Census Bureau, Website: www.factfinder.census.gov, Date accessed: April 9, 2008.

USCB, 2006c. American FactFinder 2006 American Community Survey: Economic Characteristics 2006, Pennsylvania, U.S. Census Bureau, Website: www.factfinder.census.gov, Date accessed: April 9, 2008.

USCB, 2000a. Table DP-3, Profile of Selected Economic Characteristics: 2000, Census 2000 Summary File 1 (SF 1) 100-Percent Data, Pennsylvania, U.S. Census Bureau, Website: http://factfinder.census.gov/servlet/QTTable?_bm=y&-geo_id=04000US42&-qr_name=DEC_2000_SF3_U_DP3&-ds_name=DEC_2000_SF3_U&-redoLog=false, Date accessed: April 9, 2008.

USCB, 2000b. U.S. Census 2000 Demographic Profiles: 100-Percent and Sample Data. Table DP-3, Profile of Selected Economic Characteristics: 2000, Geographic area: Luzerne County, Pennsylvania, U.S. Census Bureau, Website: http://censtats.census.gov/pub/Profiles.shtml, Date accessed: April 9, 2008.

USCB, 2000c. U.S. Census 2000 Demographic Profiles: 100-Percent and Sample Data, Table DP-3, Profile of Selected Economic Characteristics: 2000, Geographic area: Columbia County, Pennsylvania, U.S. Census Bureau, Website: http://censtats.census.gov/pub/Profiles.shtml, Date accessed: April 9, 2008.

Table 4.4-1— Typical Noise Levels of Construction Equipment

Equipment Type	Noise Level, db(A)			
	Peak[a]	at 50 ft (15.2 m)	at 220 ft (67 m)[a]	at 1600 ft (488 m)[b]
Earthmoving				
Loaders	104	73-86	60 - 73	43 – 56
Dozer	107	87-102	74 - 89	57 – 72
Scraper	93	80-89	67 - 76	50 – 59
Graders	108	88-91	75 - 78	58 – 61
Dump trucks	108	88	75	58
Heavy trucks	95	84-89	71 - 76	54 – 59
Materials Handling				
Concrete mixer	105	85	72	55
Crane	104	75-88	62 - 75	45 – 58
Forklift	100	95	82	65
Stationary				
Generator	96	76	63	46
Impact				
Pile driver	105	95	82	65
Jack hammer	108	88	75	58

Note: dBA = A-weighted decibel
a. Distance from the limit of disturbance to nearest residence
b. Distance from centerline reactor building to nearest residence

Table 4.4-2— Projected Level of Service at Key Intersections With and Without Construction of BBNPP

(Page 1 of 2)

Int. No.	Penn DOT	County	Municipality	Intersection	AM LOS Delay (sec/veh)		PM LOS Delay (sec/veh)	
					FNB	Const	FNB	Const
1	3-0	Columbia	South Center	U.S. 11 and S.R 2028	B (14.9)	**E (59.8)**	C (23.1)	**E (62.1)**
2			Briar Creek	U.S. 11 and Briar Creek Plaza Driveways	A (6.6)	**C (21.4)**	C (20.9)	**E (61.2)**
3			Berwick	U.S. 11 (Front Street) and Eaton Street	A (1.1)	A (0.8)	A (2.3)	**F (No-Gap)**
4				U.S. 11 (Front Street) and Poplar Street	C (27)	**F (176.3)**	D (40)	**F (144.9)**
5				U.S. 11 (Front Street) and Orchard Street	A (6.7)	**B (16.9)**	B (17.7)	**D (48.6)**
6				U.S. 11 (Front Street) and S.R. 93 (Orange Street)	A (5.9)	B (11.1)	B (11)	**D (51.7)**
7				U.S. 11 (Second Street) and LaSalle Street	B (11.8)	B (11.4)	B (14.1)	C (22.9)
8				U.S. 11 (Second Street) and Oak Street	A (6.2)	A (5.5)	A (8)	B (10.7)
9				U.S. 11 (Second Street) and Mulberry Street	A (4.8)	A (3.1)	A (5.7)	A (6.3)
10				U.S. 11 (Front Street) and Mulberry Street	A (6.1)	A (2.1)	A (8)	B (10.4)
11				S.R. 1025 (Market Street) and Third Street	A (9.6)	A (8)	B (12.8)	B (15.2)
12				U.S. 11 (Second Street) and Market Street	A (9.7)	**B (19.8)**	B (11.7)	B (18.1)
13				U.S. 11 (Front Street) and Market Street	B (14.2)	**E (63)**	B (15.3)	**C (30.6)**
14				U.S. 11 (Second Street) and Pine Street	A (6)	A (5)	A (8.6)	B (16.6)
15	4-0	Luzerne	Nescopeck	S.R. 93 (Third Street) and S.R. 339 (Broad Street)	B (14.1)	C (23.3)	B (12.3)	**C (22.3)**
16				S.R. 93 (Third Street) and Dewey Street	A (4.6)	A (4.4)	A (3.7)	A (5.3)
17			Salem Township	U.S. 11 and Bell Bend Site Entrance		**F (no-gap)**		**F (no-gap)**
18				U.S. 11 and SSES Site Entrance	E (47.1)	**F (no-gap)**	A (5.2)	**F (129.3)**
19			Shickshinny	U.S. 11 (S. Main Street) and S.R. 239	A (7.8)	**C (22.5)**	A (9.4)	**E (69.3)**
20				U.S. 11 (Main Street) and S.R. 239 (Union Street)	B (14.7)	**F (110.8)**	B (15.5)	**F (108.9)**
21			Nanticoke	U.S. 11 and S.R. 29 (Mill Street)	C (23.6)	**D (36)**	C (26.3)	**F (270.8)**
22				U.S. 11 and County Bridge	D (49.5)	C (22.6)	C (24.2)	**F (155.3)**
23				U.S. 11 (E. Poplar Street) and S.R. 29	A (2.9)	F (108.9)	D (30.3)	**F (325.1)**

Table 4.4-2— Projected Level of Service at Key Intersections With and Without Construction of BBNPP

(Page 2 of 2)

Int. No.	Penn DOT	County	Municipality	Intersection	AM LOS Delay (sec/veh)		PM LOS Delay (sec/veh)	
					FNB	Const	FNB	Const
Notes: A = Free flow B = Reasonably free flow C = Stable flow D = Approaching unstable flow E = Unstable flow F = Forced or breakdown flow FNB corresponds to Future Year No-Build Condition. Const corresponds to Future Year Construction without any mitigation. LOD Delays include SSES outage impacts. Yellow highlighted cells indicate cases in which the change in LOS is higher than the acceptable level of LOS degradation.								

Table 4.4-3— Estimated Average FTE Construction Workers, by Construction Year/Quarter at the BBNPP

Year / Quarter of Construction	Average FTE Construction Workforce
Year 1:	
1	350
2	800
3	1,250
4	1,600
Year 2:	
1	1,900
2	2,200
3	2,500
4	2,800
Year 3:	
1	3,050
2	3,200
3	3,350
4	3,500
Year 4:	
1	3,683
2	3,867
3	3,950
4	3,950
Year 5:	
1	3,950
2	3,917
3	3,700
4	3,400
Year 6:	
1	3,050
2	1,967
3*	768*
Note: The third "quarter" of construction year 6 has only two months; the length of the total construction period is estimated to be 68 months.	

Table 4.4-4— Total Peak Onsite Nuclear Plant Construction Labor Force Requirements (based on an average of single power plants)

Personnel Description	DOE Percent of Total Peak Personnel, Average Single Unit	DOE Peak Total Personnel, Average Single Unit	Estimated BBNPP Total Peak Workforce Composition
Craft Labor	66.7%	1,600	2,635
Craft Supervision	3.3	80	130
Site Indirect Labor	6.7	160	265
Quality Control Inspectors	1.7	40	67
NSSS Vendor and Subcontractor Staffs	5.8	140	229
EPC Contractor's Managers, Engineers, and Schedulers	4.2	100	166
Owner's O&M Staff	8.3	200	328
Start-Up Personnel	2.5	60	99
NRC Inspectors	0.8	20	32
Total Peak Construction Labor Force	100.0 %	2,400	3,950

Notes:

EPC = Engineering, Procurement, and Construction
O&M = operation and maintenance
NRC = Nuclear Regulatory Commission
NSSS = Nuclear Steam Supply System
Percentages and numbers may total slightly more or less than the total due to rounding.

Table 4.4-5— Peak Onsite Nuclear Power Plant Construction Craft Force Requirements (based on an average of single power plants)

Craft Personnel Description	DOE Percent of Peak Craft Labor Personnel, Average Single Unit	DOE Peak Craft Labor Personnel, Average Single Unit	Estimated BBNPP Peak Craft Workforce Composition
Boilermakers	4.0 %	60	105
Carpenters	10.0	160	264
Electricians/Instrument Fitters	18.0	290	474
Iron Workers	18.0	290	474
Insulators	2.0	30	53
Laborers	10.0	160	264
Masons	2.0	30	53
Millwrights	3.0	50	79
Operating Engineers	8.0	130	211
Painters	2.0	30	53
Pipefitters	17.0	270	448
Sheetmetal Workers	3.0	50	79
Teamsters	3.0	50	79
Total Craft Labor Force	100.0 %	1,600	2,635
Notes: Percentages and numbers may total slightly more or less than the total due to rounding.			

Table 4.4-6— Nuclear Power Plant Craft Labor Force Composition by Phases of Construction (in percent)

Craft Labor	Percentage of Craft Labor Force by Construction Phase						
	Concrete Formwork, Rebar, Embeds, Concrete	Structural Strength Steel, Misc. Iron & Architectural	Earthwork Clearing, Excavation, Backfill	Mechanical Equipment Installation	Piping Installation	Instrument Installation	Electrical Installation
Boilermakers				15			
Carpenters	40	5					2
Electricians/Instrument Fitters						70	96
Iron Workers	20	75		10			
Laborers	30	5	60				1
Millwrights				25			
Operating Engineers	5	15	35	12	15	2	1
Pipefitters				35	80	28	
Teamsters			5	3	5		
Others	5						
Total Percentage of Craft Labor Force	100	100	100	100	100	100	100

Table 4.4-7— Estimates of In-Migrating Construction Workforces in Luzerne County and Columbia County, 20% In-Migration Scenario, from 2012-2017

In-migration Characteristics	Luzerne County	Columbia County	Total ROI
Direct Workforce:			
Maximum Direct Workforce			3,950
Percent of Current SSES Units 1 & 2 Workforce Distribution	42.3%	44.8%	87.1%
Estimated In-migrating Direct Workforce (@ 20% assumption)	334	354	688
In-migrating Direct Workforce Population (@2.48 people/ household)	829	878	1,706
Indirect Workforce:			
Estimated Distribution of Peak Direct Workforce	334	354	688
Peak Indirect Workforce (@1.3866 BEA multiplier)	463	491	954
Indirect Workforce Needs That Could Be Met by Direct Workforce Spouses (@52.2% working females 16 years old and older)	258	273	532
Remaining, Unmet Indirect Workforce Need	205	217	423
Number of Indirect Households Meeting Unmet Need (@1.522 Workers/Households)	135	143	278
In-migrating Indirect Workforce Population (@2.48 people / household)	334	354	688
Total In-migrating Direct and Indirect Workforce People:	1,163	1,232	2,395

Notes:

1. Estimated construction employment multiplier of 1.3866 for the two county ROI. (BEA, 2008)
2. U.S. Census Bureau 2000 census data indicates that the Commonwealth of Pennsylvania had 2.48 people per household.
3. U.S. Census Bureau 2000 census data indicates that, within the Commonwealth of Pennsylvania, 52.2% of households had a working female 16 years old or older (assumed to be a spouse).
4. Numbers estimated for the ROI may vary slightly due to rounding to the nearest whole number.

Table 4.4-8— Estimates of In-Migrating Construction Workforces in Luzerne County and Columbia County, 35% In-Migration Scenario, from 2012-2017

In-migration Characteristics	Luzerne County	Columbia County	Total ROI
Direct Workforce:			
Maximum Direct Workforce			3,950
Percent of Current SSES Units 1 & 2 Workforce Distribution	42.3%	44.8%	87.1%
Estimated In-migrating Direct Workforce (@ 35% assumption)	585	619	1,204
In-migrating Direct Workforce Population (@2.48 people/ household)	1,450	1,536	2,986
Indirect Workforce:			
Estimated Distribution of Peak Direct Workforce	585	619	1,204
Peak Indirect Workforce (@1.3866 multiplier)	811	859	1,670
Indirect Workforce Needs That Could Be Met by Direct Workforce Spouses (@52.2% working females 16 years old and older)	452	478	930
Remaining, Unmet Indirect Workforce Need	359	380	739
Number of Indirect Households Meeting Unmet Need (@1.522 Workers/Household)	236	250	486
In-migrating Indirect Workforce Population (@2.48 people / household)	585	620	1,205
Total In-migrating Direct and Indirect Workforce People:	2,035	2,156	4,191

Notes:

1. Estimated construction employment multiplier of 1.3866 for the two county ROI. (BEA, 2008)
2. U.S. Census Bureau 2000 census data indicates that the Commonwealth of Pennsylvania had 2.48 people per household.
3. U.S. Census Bureau 2000 census data indicates that, within the Commonwealth of Pennsylvania, 52.2% of households had a working female 16 years old or older (assumed to be a spouse for this analysis).
4. Numbers estimated for the ROI may vary slightly due to rounding to the nearest whole number.

Table 4.4-9— Total Work Force Potential During BBNPP Construction, SSES Units 1 and 2 Operations, and SSES Outage Periods

Workforce Groups	Workforce Potential	Total
SSES Units 1 and 2 Operations and Outage		
Units 1 & 2 Operations	1,247	
Units 1 & 2 Outage Workers	1,400 [1]	
Maximum Existing Operational Workforce		2,647
BBNPP Construction		
Peak BBNPP Direct Construction Workforce Accessing Site Daily	3,950 [2]	
Cumulative SSES Units 1 & 2, Outage, plus Peak Direct Construction Workforce		6,597
Indirect In-Migration (35% scenario)	2,987 [3]	
Cumulative Peak Operations, Construction & Outage Workforce		9,584

Notes:

1. Outage workforces would be rotated across years so that an outage would occur for only one unit at a time, usually scheduled for each March.
2. This is the estimated peak construction workforce that would access the BBNPP site on a daily basis.
3. Under the 35% scenario, a maximum of 1,204 of the peak construction workers, 1,670 indirect workers (assumed to be spouses), and 1,317 other family members would in-migrate into the ROI.

Table 4.4-10— Summary of Level of Service (LOS) at Selected Intersections Following Mitigation

(Page 1 of 2)

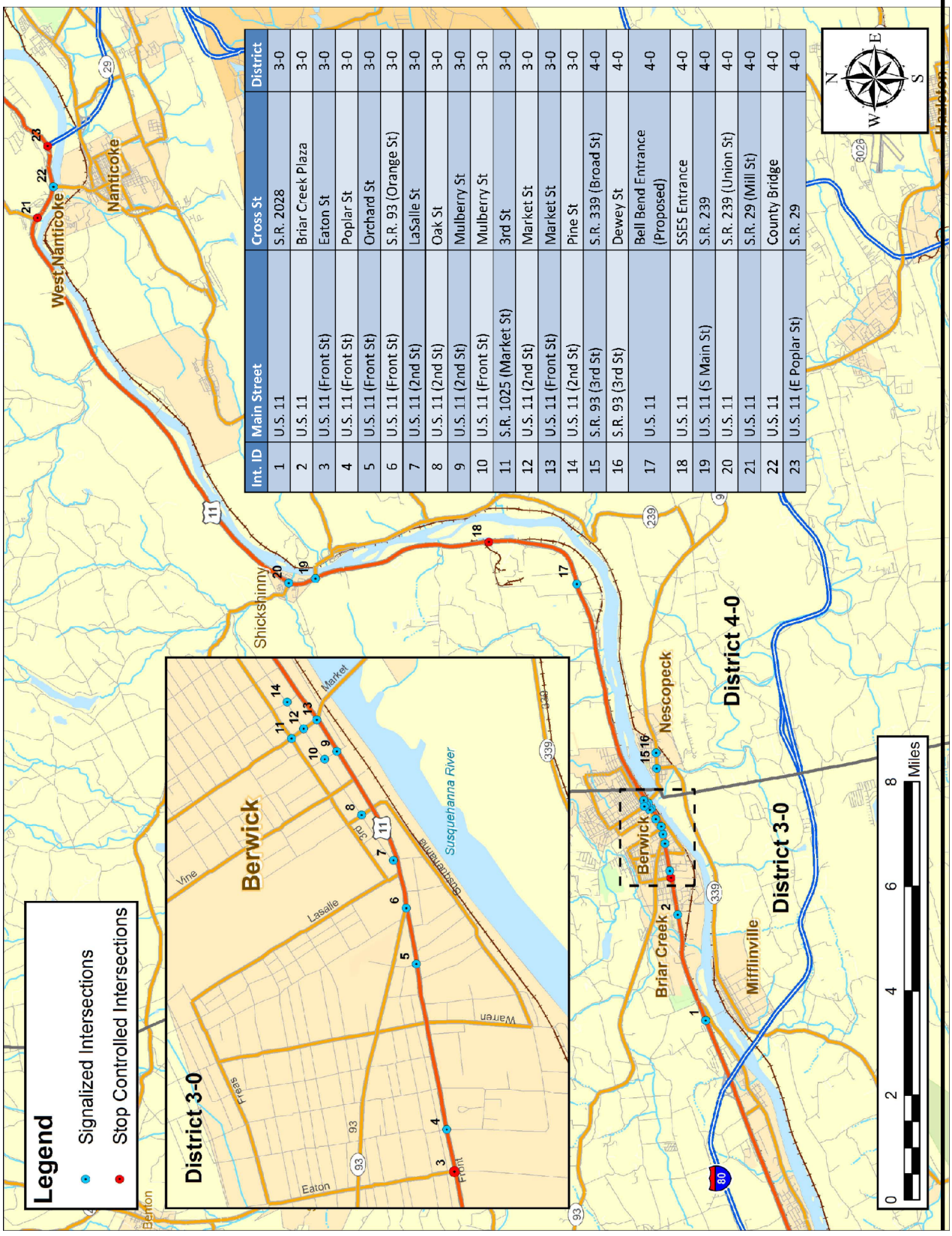
Int. No.	Penn DOT	County	Municipality	Intersection	Mitigation Measures	AM LOS(delay)		PM LOS(delay)	
						FNB	Const	FNB	Const
1	3-0	Columbia	South Center	U.S. 11 and S.R 2028	Add Thru Lane on RT 11 NB	B (14.9)	B (10.8)	C (23.1)	C (27.5)
2			Briar Creek	U.S. 11 and Briar Creek Plaza Driveways	Add Thru Lane on RT 11 SB	A (6.6)	C (21.5)	C (20.9)	B (16.2)
3			Berwick	U.S. 11 (Front Street) and Eaton Street	New Traffic Signal		B (11.9)		C (30.4)
4				U.S. 11 (Front Street) and Poplar Street	Restriping on Poplar Street	C (27)	D (36.8)	D (40)	B (17.2)
5				U.S. 11 (Front Street) and Orchard Street		A (6.7)	A (8)	B (17.7)	D (49.1)
6				U.S. 11 (Front Street) and S.R. 93 (Orange Street)		A (5.9)	B (11.5)	B (11)	D (45.7)
7				U.S. 11 (Second Street) and LaSalle Street		B (11.8)	A (8.3)	B (14.1)	B (12.6)
8				U.S. 11 (Second Street) and Oak Street		A (6.2)	A (7.4)	A (8)	A (7.7)
9				U.S. 11 (Second Street) and Mulberry Street		A (4.8)	A (3.4)	A (5.7)	A (6)
10				U.S. 11 (Front Street) and Mulberry Street		A (6.1)	B (12.1)	A (8)	A (8.4)
11				S.R. 1025 (Market Street) and Third Street		A (9.6)	A (8.8)	B (12.8)	B (12.8)
12				U.S. 11 (Second Street) and Market Street	Restriping on Market Street	A (9.7)	A (6.3)	B (11.7)	B (14)
13				U.S. 11 (Front Street) and Market Street	Restrict Parking on Front Street	B (14.2)	B (16.3)	B (15.3)	A (8.8)
14				U.S. 11 (Second Street) and Pine Street		A (6)	A (7.6)	A (8.6)	B (15.9)

Table 4.4-10— Summary of Level of Service (LOS) at Selected Intersections Following Mitigation
(Page 2 of 2)

Int. No.	Penn DOT	County	Municipality	Intersection	Mitigation Measures	AM LOS(delay)		PM LOS(delay)	
						FNB	Const	FNB	Const
15	4-0	Luzerne	Nescopeck	S.R. 93 (Third Street) and S.R. 339 (Broad Street)		B (14.1)	C (22.6)	B (12.3)	B (16.4)
16				S.R. 93 (Third Street) and Dewey Street		A (4.6)	A (4.6)	A (3.7)	A (4.3)
17			Salem Township	U.S. 11 and Bell Bend Site Entrance	Proposed Site Access Road		C (20.2)		B (19.6)
18				U.S. 11 and SSES Site Entrance	Temporary Traffic Signal		D (35.2)		D (35.2)
					Add Thru Lane on SB U.S. 11				
19			Shickshinny	U.S. 11 (S. Main Street) and S.R. 239	Add Thru Lane on SB U.S. 11	A (7.8)	A (5.6)	A (9.4)	B (10.8)
					Add Thru Lane on NB U.S. 11				
					Add Right turn bay on S.R. 239 onto U.S. 11				
20				U.S. 11 (Main Street) and S.R. 239 (Union Street)	Restrict Parking on U.S. 11 SB	B (14.7)	B (14.9)	B (15.5)	B (18)
21			Nanticoke	U.S. 11 and S.R. 29 (Mill Street)	Modify intersection to provide un-interrupted flow for NB U.S. 11	C (23.6)	C (29.5)	C (26.3)	C (21.5)
22				U.S. 11 and County Bridge	Add Thru Lane on U.S. 11 NB	D (49.5)	B (14.1)	C (24.2)	C (31.1)
					Make U.S. 11 NB 2 lanes to intersection with S.R. 29				
23				U.S. 11 (E. Poplar Street) and S.R. 29	Temporary Traffic Signal		C (23.3)		B (16.8)
					Restrict left turn from SB U.S. 11 onto NB U.S. 29				

Notes:
A = Free flow
B = Reasonably free flow
C = Stable flow
D = Approaching unstable flow
E = Unstable flow
F = Forced or breakdown flow
"Delay" is average vehicle delay in (seconds/vehicle).
FNB corresponds to Future Year No-Build Condition. Const corresponds to Future Year Construction with mitigation in place.
LOD Delays include SSES outage impacts.
Yellow highlighted cells indicate cases in which the proposed mitigation does not fully address the impact.
Blue highlighted cells indicate locations that involve no significant infrastructure changes.

Figure 4.4-1— BBNPP Traffic Impact Assessment Study Area



Int. ID	Main Street	Cross St	District
1	U.S. 11	S.R. 2028	3-0
2	U.S. 11	Briar Creek Plaza	3-0
3	U.S. 11 (Front St)	Eaton St	3-0
4	U.S. 11 (Front St)	Poplar St	3-0
5	U.S. 11 (Front St)	Orchard St	3-0
6	U.S. 11 (Front St)	S.R. 93 (Orange St)	3-0
7	U.S. 11 (2nd St)	LaSalle St	3-0
8	U.S. 11 (2nd St)	Oak St	3-0
9	U.S. 11 (2nd St)	Mulberry St	3-0
10	U.S. 11 (Front St)	Mulberry St	3-0
11	S.R. 1025 (Market St)	3rd St	3-0
12	U.S. 11 (2nd St)	Market St	3-0
13	U.S. 11 (Front St)	Market St	3-0
14	U.S. 11 (2nd St)	Pine St	3-0
15	S.R. 93 (3rd St)	S.R. 339 (Broad St)	4-0
16	S.R. 93 (3rd St)	Dewey St	4-0
17	U.S. 11	Bell Bend Entrance (Proposed)	4-0
18	U.S. 11	SSES Entrance	4-0
19	U.S. 11 (S Main St)	S.R. 239	4-0
20	U.S. 11	S.R. 239 (Union St)	4-0
21	U.S. 11	S.R. 29 (Mill St)	4-0
22	U.S. 11	County Bridge	4-0
23	U.S. 11 (E Poplar St)	S.R. 29	4-0

Figure 4.4-2— Cumulative Overlapping 50 mi (80 km) Zones for Nuclear Power Plants Surrounding BBNPP