R. R. Sgarro
Manager, Nuclear Regulatory Affairs

PPL Bell Bend, LLC
38 Bomboy Lane, Suite 2
Berwick, PA 18603
Tel. 570.802.8102 FAX 570.802.8119
rrsgarro@pplweb.com

October 19, 2009

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

BELL BEND NUCLEAR POWER PLANT
RESPONSE TO ENVIRONMENTAL
REQUESTS FOR ADDITIONAL
INFORMATION, SIXTH SUBMITTAL
BNP-2009-313 Docket No. 52-039

References: 1) Letter from U.S. NRC Document Control Desk to R.R. Sgarro (PPL), "Requests for Additional Information Related to the Environmental Review for the Combined License Application for Bell Bend Nuclear Power Plant," dated July 10, 2009

The purpose of this letter is to respond to several Environmental Report (ER) requests for additional information (RAIs) identified in the referenced NRC correspondence to PPL Bell Bend, LLC. These RAIs address environmental issues, as discussed in Part 3 of the Bell Bend Nuclear Power Plant Combined License Application (COLA).

Enclosure 1 provides the current ER RAI response status and the planned submittal dates for the remaining responses. The planned submittal date for some of the RAIs has been changed as compared to the schedule provided in PPL letter BNP-2009-282, dated September 25, 2009. These RAIs are identified with a footnote in Enclosure 1.

PPL plans to transmit a series of responses to the RAIs on or before the planned submittal dates provided in Enclosure 1. The planned submittal schedule is subject to change as PPL collects/develops the information required for the responses. PPL will keep the NRC staff informed of schedule changes during our weekly status updates in addition to updates in our subsequent submittals. Enclosure 2 provides responses to 14 RAIs (12 new responses and two revised responses). Several RAIs include revised COLA content. A Licensing Basis Document Change Request has been initiated to incorporate these changes in a future revision of the COLA.

The commitment contained in this submittal is the future revision of the COLA as indicated in Enclosure 2.

Enclosure 3 contains data files for RAI RHH 4.5-2. Enclosure 4 contains the references associated with RAI STO 1-1.

D079
NRO

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

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

Executed on October 19, 2009

Respectfully,

Rocco R. Sgarro

RRS/kw

Enclosures: 1) Response Status for Environmental Requests for Additional Information, Bell Bend Nuclear Power Plant, Luzerne County Pennsylvania

2) Responses to Environmental Requests for Additional Information, Bell Bend Nuclear Power Plant, Luzerne County Pennsylvania

3) RAI RHH 4.5-2 Data Files, Bell Bend Nuclear Power Plant, Luzerne County Pennsylvania, (Compact Disc)

4) RAI STO 1-1 References, Bell Bend Nuclear Power Plant, Luzerne County Pennsylvania, (Digital Video Disc)

cc: Mr. Joseph Colaccino
Branch Chief
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Mr. Samuel J. Collins
Regional Administrator
U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406-1415

Mr. Michael Canova
Project Manager
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Ms. Stacey Imboden
Project Manager
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Enclosure 1

Response Status for Environmental Requests for Additional Information
Bell Bend Nuclear Power Plant
Luzerne County Pennsylvania

NRC Response Status for Environmental Requests for Additional Information (RAIs)		
RAI	**Review Plan Section**	**Planned Submittal Schedule**
ACC 7.1-1	ESRP 7.1 10	Submitted August 10, 2009
ACC 7.1-2	ESRP 7.1	Submitted August 5, 2009
ACC 7.2-1	ESRP 7.2	Submitted August 10, 2009
ACC 7.2-2	ESRP 7.2	Submitted August 10, 2009
ACC 7.2-3	ESRP 7.2	Submitted August 10, 2009
ACC 7.2-4	ESRP 7.2	Submitted August 10, 2009
ACC 7.2-5 (revised response)	ESRP 7.2	Included in Enclosure 2
ACC 7.2-6	ESRP 7.2	Submitted August 10, 2009
ACC 7.3-1	ESRP 7.3	Submitted September 17, 2009
ACC 7.3-2	ESRP 7.3	Submitted August 10, 2009
ACC 7.3-3	N/A	Submitted August 10, 2009
ACC 7.3-4	N/A	Submitted September 25, 2009
ACC 7.3-5	N/A	Submitted August 10, 2009
MET 2.7-1	ESRP 2.7	November 30, 2009[1]
MET 2.7-2	ESRP 2.7	November 30, 2009[1,2]
MET 2.7-3	ESRP 2.7	Submitted September 11, 2009
MET 2.7-4	ESRP 2.7	Submitted September 17, 2009
MET 5.3-1	ESRP 2.7, ESRP 5.3.3.1	November 30, 2009[1,2]
MET 5.3-2	ESRP 2.7, ESRP 5.3.3.1	Submitted August 10, 2009
MET 5.3-3	ESRP 5.3.3.1	Submitted August 10, 2009
MET 5.3-4	ESRP 5.3.3.1	Submitted September 11, 2009
MET 5.3-5	ESRP 5.3.3.1	Submitted August 10, 2009
MET 6.4-1	ESRP 2.7, ESRP 6.4	Submitted September 17, 2009
MET 6.4-2	ESRP 6.4	Submitted September 17, 2009
ALT 9.3-1	ESRP 9.3	November 30, 2009[1,2]
ALT 9.3-2	ESRP 9.3	Included in Enclosure 2
ALT 9.3-3	ESRP 9.3	Submitted September 11, 2009
ALT 9.3-4	ESRP 9.3	Submitted September 25, 2009
ALT 9.3-5	ESRP 9.3	November 30, 2009[1,2]
AE 2.3-1	ESRP 2.3.1	Included in Enclosure 2
AE 2.3-2	ESRP 2.3.1	Submitted August 5, 2009
AE 2.3-3	ESRP 2.3.1	Submitted September 25, 2009
AE 2.4-1	ESRP 2.4.2	Submitted August 5, 2009
AE 2.4-2	ESRP 2.4.2	Submitted August 5, 2009
AE 2.4-3	ESRP 2.4.2	Submitted August 5, 2009
AE 2.4-4	ESRP 2.4.2	Submitted August 5, 2009
AE 2.4-5	ESRP 2.4.2	Submitted August 5, 2009
AE 3.4-1	ESRP 3.4.2	Submitted August 10, 2009
AE 3.4-2	ESRP 3.4.2	November 30, 2009[1,2]
AE 3.4-3	ESRP 3.4.2	Submitted August 10, 2009
AE 3.4-4	ESRP 3.4.2	Submitted August 10, 2009
AE 4.3-1	ESRP 4.3.2	Submitted August 5, 2009
AE 4.3-2	ESRP 4.3.2	January 15, 2009[1]
AE 4.3-3	ESRP 4.3.2	Included in Enclosure 2
AE 4.3-4	ESRP 4.3.2	November 30, 2009[1,2]
AE 5.3-1	ESRP 5.3.1.2	Submitted August 10, 2009
AE 5.3-2	ESRP 5.3.1.2	Submitted August 5, 2009
AE 9.3-1	ESRP 9.3	November 30, 2009[1,2]
AE 9.3-2	ESRP 9.3	Submitted September 17, 2009
AE 9.3-3	ESRP 9.3	Submitted September 17, 2009
AE 9.3-4	ESRP 9.3	Submitted September 25, 2009
CR 2.5-1	ESRP 4.1.3, ESRP 5.1.3	Submitted August 10, 2009
CR 2.5-2	ESRP 4.1.3	Submitted August 10, 2009

NRC Response Status for Environmental Requests for Additional Information (RAIs)		
RAI	**Review Plan Section**	**Planned Submittal Schedule**
CR 2.5-3	ESRP 4.1.3, ESRP 5.1.3	Submitted August 10, 2009
CR 2.5-4	ESRP 4.1.3, ESRP 5.1.3	Submitted August 10, 2009
CR 2.5-5	ESRP 2.5.2, ESRP 2.5.3	Submitted August 10, 2009
CR 2.5-6	ESRP 2.5.2, ESRP 2.5.3	November 30, 2009[1,2]
CR 2.5-7	ESRP 4.1.3, ESRP 5.1.3	November 30, 2009[1,2]
CR 2.5-8	ESRP 4.1.3, ESRP 5.1.3	November 30, 2009[1,2]
STO 1-1	N/A	Included in Enclosure 2
STO 2.1-1	ESRP 2.2, 2.4, 2.5, 4.3	November 30, 2009[1,2]
STO 2.1-2	ESRP 2.1	Submitted August 10, 2009
STO 2.2-1	ESRP 2.2	Submitted September 17, 2009
STO 2.3-1	ESRP 2.3	Submitted September 25, 2009
GEO 2.6-1	ESRP 2.6	Submitted September 11, 2009
H 2.3-1	ESRP 2.3-2	Submitted September 17, 2009
H 2.3-2	ESRP 2.3-2	Submitted September 17, 2009
H 3.4-1	ESRP 3.4.1	Submitted September 25, 2009
H 3.6-1	ESRP 3.6.1	Submitted September 17, 2009
H 3.6-2	ESRP 3.6.1	Submitted August 5, 2009
H 4.2-1	ESRP 4.2.1	November 30, 2009[1,2]
H 5.2-1	ESRP 5.2.2	Submitted September 25, 2009
H 5.3-1	ESRP 5.3.2.1	November 30, 2009[1,2]
H 6.3-1	ESRP 6.3	Included in Enclosure 2
H 9.3-1	ESRP 9.3	November 30, 2009[1,2]
H 9.4-1	ESRP 9.4.2	Submitted August 10, 2009
H 9.4-2	ESRP 9.4.2	Submitted August 10, 2009
H 9.4-3	ESRP 9.4.2	Submitted September 11, 2009
LU 2.2-1	ESRP 2.2.1	Submitted August 5, 2009
LU 3.7-1	ESRP 4.1	January 15, 2010[1]
LU 4.1-1	ESRP 4.1	January 15, 2010[1]
LU 5.1-1	ESRP 4.1	January 15, 2010[1]
LU 5.1-2	ESRP 4.1	January 15, 2010[1]
NRHH 10.5-1	N/A	Submitted August 10, 2009
RHH 4.5-1	ESRP 4.5, ESRP 5.4-2	Submitted August 10, 2009
RHH 4.5-2	ESRP 4.5	Included in Enclosure 2
RHH 4.5-3	ESRP 4.5	Submitted September 25, 2009
RHH 5.4-1	ESRP 5.4.2	Submitted September 11, 2009
SE 2.5-1	ESRP 2.5.1	Submitted August 5, 2009
SE 2.5-2	ESRP 2.5.1	November 30, 2009[1,2]
SE 2.5-3	ESRP 2.5.2	Included in Enclosure 2
SE 2.5-4	ESRP 2.5.2	Included in Enclosure 2
SE 2.5-5	ESRP 2.5.2	Submitted August 10, 2009
SE 2.5-6	ESRP 2.5.2	Submitted August 5, 2009
SE 2.5-7	ESRP 2.5.2	Included in Enclosure 2
SE 2.5-8	ESRP 2.5.2	Included in Enclosure 2
SE 2.5-9	ESRP 2.5.2	Submitted September 11, 2009
SE 2.5-10	ESRP 2.5.4	Submitted September 17, 2009
SE 2.5-11	ESRP 2.5.4	Submitted August 10, 2009
SE 2.5-12	ESRP 2.5.4	Submitted August 10, 2009
SE 2.5-13	ESRP 2.5.4	Submitted September 17, 2009
SE 4.4-1	ESRP 4.4.1	Submitted August 10, 2009
SE 4.4-2	ESRP 4.4.1	Submitted August 10, 2009
SE 4.4-3	ESRP 4.4.2	Submitted September 25, 2009
SE 4.4-4	ESRP 4.4.2	November 30, 2009[1,2]
SE 4.4-5	ESRP 4.4.2	Submitted August 5, 2009
SE 4.4-6	ESRP 4.4.2	Submitted August 10, 2009

NRC Response Status for Environmental Requests for Additional Information (RAIs)		
RAI	**Review Plan Section**	**Planned Submittal Schedule**
SE 4.4-7	ESRP 4.4.2	Submitted September 17, 2009
SE 4.4-8	ESRP 4.4.2	Submitted September 17, 2009
SE 4.4-9	ESRP 4.4.2	November 30, 2009[1,2]
SE 4.4-10	ESRP 4.4.2	Submitted September 17, 2009
SE 4.4-11	ESRP 4.4.2	Included in Enclosure 2
SE 4.4-12	ESRP 4.4.2	Submitted September 25, 2009
SE 4.4-13	ESRP 4.4.2	Included in Enclosure 2
SE 4.4-14	ESRP 4.4.3	Submitted September 17, 2009
SE 5.8-1	ESRP 5.8.2	Submitted September 17, 2009
SE 5.8-2	ESRP 5.8.2	Submitted August 5, 2009
CB 10.4-1	ESRP 10.4.2	November 30, 2009[1,2]
TE 2.4-1 (revised response)	ESRP 2.2.1	Included in Enclosure 2
TE 2.4-2	ESRP 2.2.1	Submitted August 5, 2009
TE 2.4-3	ESRP 2.4.1	Submitted September 11, 2009
TE 2.4-4	ESRP 2.4.1	Submitted August 10, 2009
TE 2.4-5 (revised response)	ESRP 2.4.1	Submitted September 11, 2009
TE 2.4-6	ESRP 2.4.1	January 15, 2010[1]
TE 2.4-7	ESRP 2.4.1	January 15, 2010[1]
TE 2.4-8	ESRP 2.4.1	January 15, 2010[1]
TE 4.3-1	ESRP 4.3.1	January 15, 2010[1]
TE 4.3-2	ESRP 4.3.1	January 15, 2010[1]
TE 4.3-3	ESRP 4.3.1	Submitted September 11, 2009
TE 4.3-4	ESRP 4.3.1	January 15, 2010[1]
TE 4.3-5	ESRP 4.3.1	Submitted August 10, 2009
TE 4.3-6	ESRP 4.3.1	Submitted August 10, 2009
TE 4.3-7	ESRP 4.3.1, ESRP 9.3	January 15, 2010[1]
TE 4.3-8	ESRP 4.3.1	January 15, 2010[1,2]
TE 4.3-9	ESRP 4.3.1	Submitted September 25, 2009
TE 4.3-10	ESRP 4.3.1	January 15, 2010[1]
TR 4.7-1	ESRP 4.7	Submitted September 25, 2009
TR 4.7-2	ESRP 4.7	Submitted August 10, 2009

USACE Response Status for Environmental RAIs	
RAI	**Planned Submittal Schedule**
USACE-1	November 30, 2009[1,2]
USACE-1a	November 30, 2009[1,2]
USACE-1b	November 30, 2009[1,2]
USACE-2	November 30, 2009[1,2]
USACE-2a	November 30, 2009[1,2]
USACE-2b	November 30, 2009[1,2]
USACE-2c	November 30, 2009[1,2]
USACE-2d	November 30, 2009[1,2]
USACE-2e	November 30, 2009[1,2]
USACE-2f	November 30, 2009[1,2]
USACE-2g	Submitted September 25, 2009
USACE-2h	November 30, 2009[1,2]
USACE-3	November 30, 2009[1,2]

[1]The responses to these RAIs were requested to be provided within 30 calendar days. Based on vendor review and input, the time required to complete the necessary work will exceed this timeframe and PPL requests additional time, as indicated above.
[2]The planned submittal date for this RAI response has been revised since the September 25, 2009, submittal.

Enclosure 2

Responses to Environmental Requests for Additional Information
Bell Bend Nuclear Power Plant
Luzerne County Pennsylvania

ACC 7.2-5, Revised Response

ESRP 7.2

Summary: *Provide reference and justification for the 5.7 person-rem/yr value for normal operation used in ER.*

Full Text: The ER states that "as reported in ER Section 5.4, the total collective dose from normal operations is ... 5.7 person-rem per year." Where in ER Section 5.4 is this information? Please justify this conclusion.

Response: The reference to 5.7 person-rem in ER Section 7.2.3 was incorrect. This is corrected in the COLA Impact portion of this response.

The correct value from BBNPP ER Table 5.4-15 and Table 5.4-19 is shown below.

- ER Table 5.4-15 states that the 50-mile total body year 2070 population dose from gaseous effluents is 5.31 person-rem.
- ER Table 5.4-19 states that the 50-mile total body population dose from liquid effluents is 0.165 person-rem. This table also refers to the 2070 population.

Therefore, the total collective dose from normal operations is approximately 5.5 person-rem per year. Additionally, the projected 50-mile population for year 2080 has been changed to year 2070 consistent with BBNPP ER Table 5.4-15 and 5.4-19.

The severe accident dose-risk in ER Section 7.2.3 was incorrect. This is corrected in the COLA Impact portion of this response.

COLA Impact:
BBNPP COLA ER Section 7.2.3 and Table 5.4-19 will be revised as follows in a future revision of the COLA:

7.2.3 CONCLUSIONS

The total calculated dose-risk to the 50 mi (80 km), year 2050 estimated population from airborne releases from a U.S. EPR reactor at BBNPP is expected to be approximately 0.31 person-rem per year (Table 7.2-3). The fraction of core inventory assumed to be released in each of the release categories is also included in Table 7.2-2. The number of persons exposed to doses greater than 200 rem (2 Sv) and 25 rem (0.25 Sv) are 1.40E-05 and 2.16E-04, respectively. It must be noted that these populations exceeding a dose are only calculated by MACCS2 for the early phase of an accident, the long-term dose that could be accumulated is not included in this result. Long-term doses are mitigated by emergency response and remedial measures.

The U.S. EPR dose-risk at the BBNPP site is less than the population risk for ~~all~~ current reactors that have undergone license renewal, and less than that for the five reactors analyzed in NUREG-1150 (NRC, 1990). As reported in NUREG-1811 (NRC, 2006), the lowest dose-risk reported for reactors currently undergoing license renewal is 0.55 person-rem per year.

The qualitative analysis indicates that risk from the surface water pathway is small. The risks of groundwater contamination from a U.S. EPR accident are several orders of magnitude less than

the risk from surface water contamination for currently licensed reactors. The risk of groundwater contamination from an U.S. EPR accident is smaller than the risk from currently licensed reactors. Additionally, interdiction could substantially reduce the groundwater pathway risks.

For comparison, as reported in ER Section 5.4, the total collective dose from normal operations is expected to be ~~5.7~~ 5.5 person-rem per year for BBNPP (based on liquid and gaseous effluent for the projected 50-mile population for year ~~2080~~ 2070). As previously described, dose-risk is dose times frequency. Normal operation has a frequency of one. Therefore, the dose-risk for normal operation is ~~5.7~~ 5.5 person-rem per year. Comparing this value to the severe accident dose-risk of approximately ~~0.61~~ 0.26 person-rem per year (2080 conservative estimate) indicates that the dose risk from severe accidents is less than ~~11~~ 5 percent of dose risk from normal operations.

The probability-weighted number of cancer fatalities from a severe accident for the U.S. EPR at BBNPP is reported in Table 7.2-3 as 1.63 E-04 per year. The lifetime probability of an individual dying from any cancer is 2.3 E-01 (NCHS, 2007).

Table 5.4-19 General Population Doses from Liquid Effluents

Person-Rem (Total Body Person-Sieverts)	Person-Thyroid-Rem (Person-Thyroid-Sieverts)
1.65E-01 (1.65E-03)	1.68E-01 (1.68E-03)
Includes dose contribution from sport fishing, boating, and consumption of potable water exposures to the 50 mi (80 km) population impacted by water uses of the Susquehanna River 50 mi (80 km) downstream. Based on projected 50 mi (80 km) population for the year 2070.	

ALT 9.3-2

ESRP 9.3

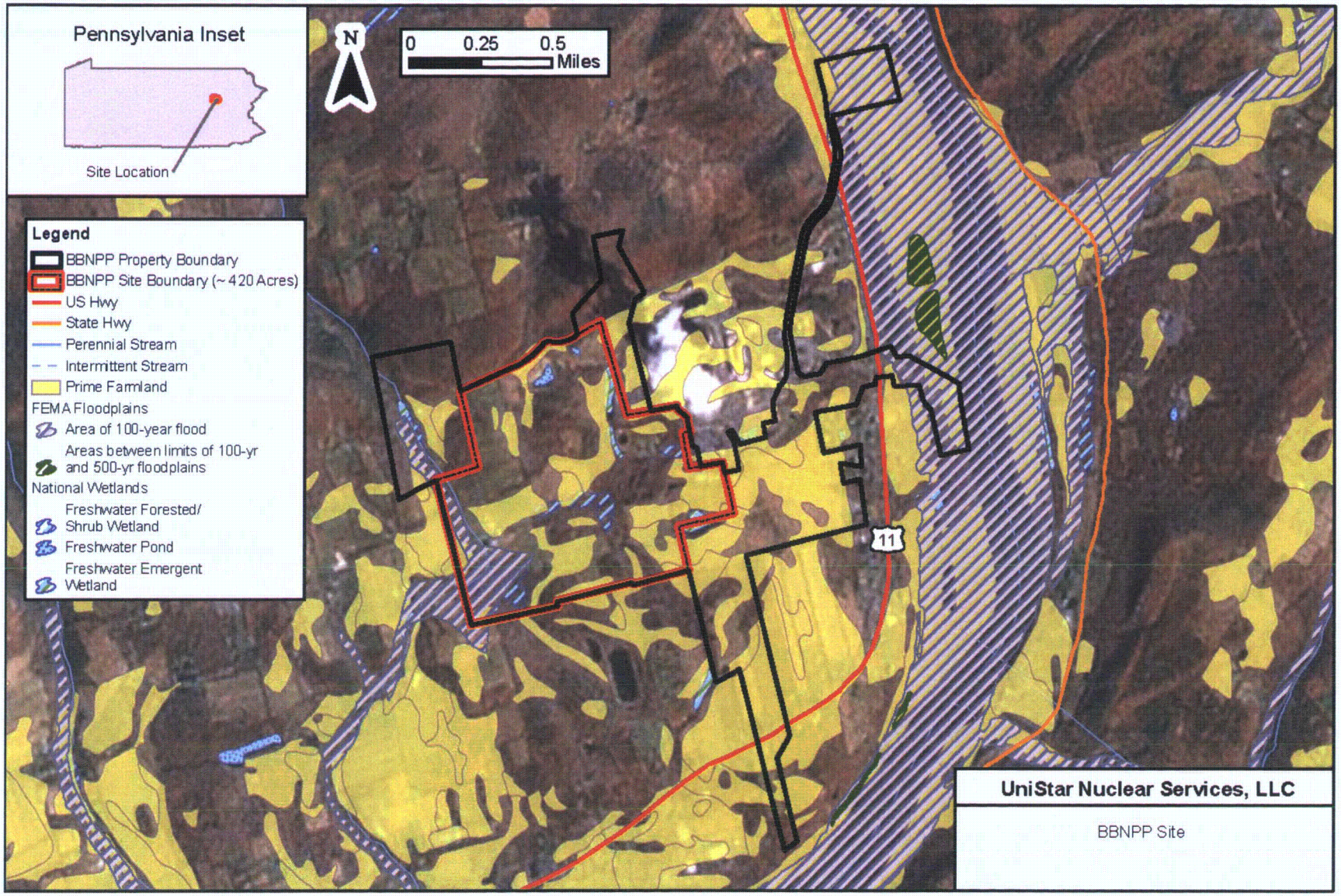
Summary: *Provide the detailed maps of the proposed site and all alternatives sites that show floodplains (100 & 500 year), wetlands, and prime or unique farmland.*

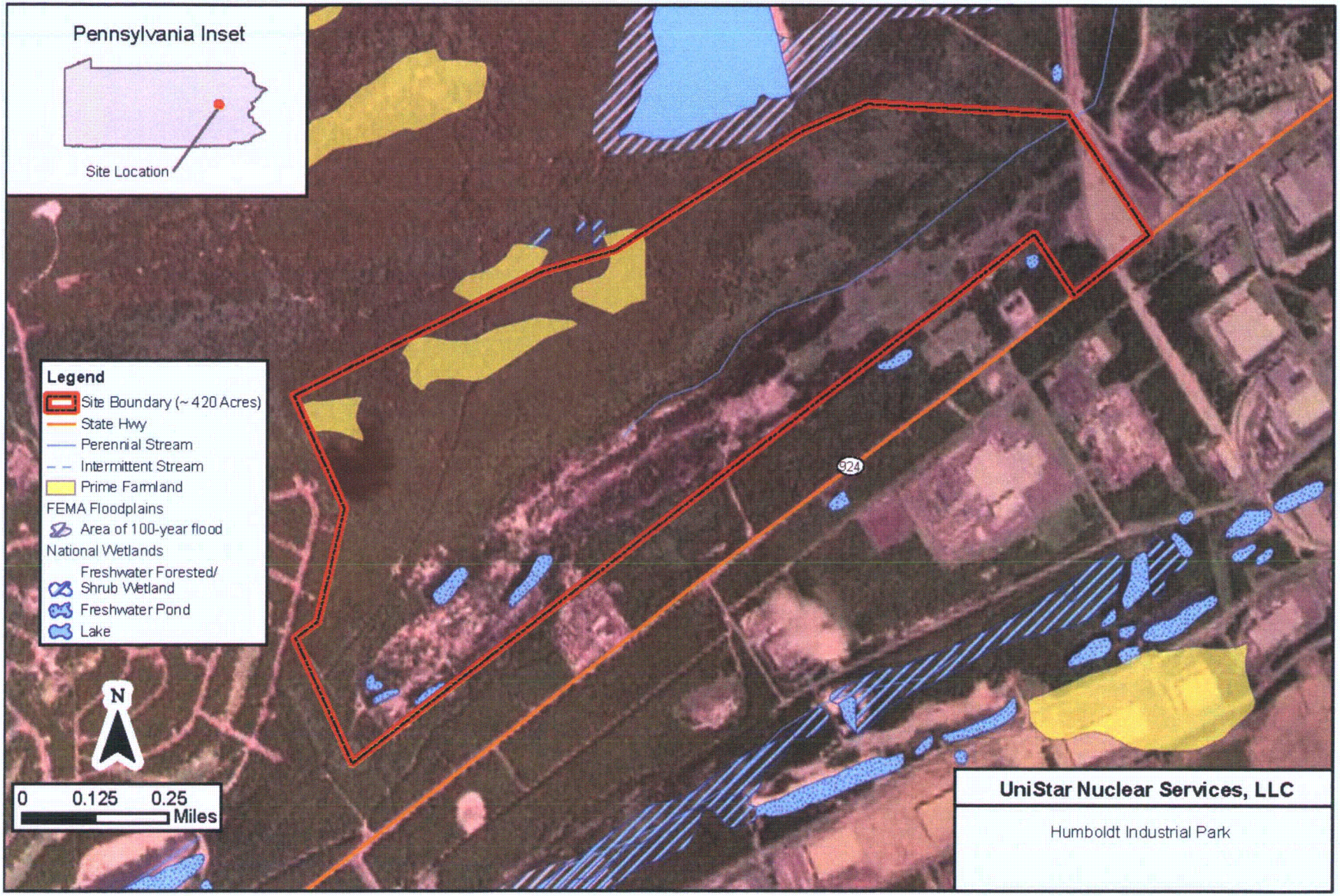
Full Text: These environmental factors were used in the alternative site screening process, and have specific regulatory authorities for their protection. ESRP 9.3 indicates that such data should be provided on maps of adequate scale and detail.

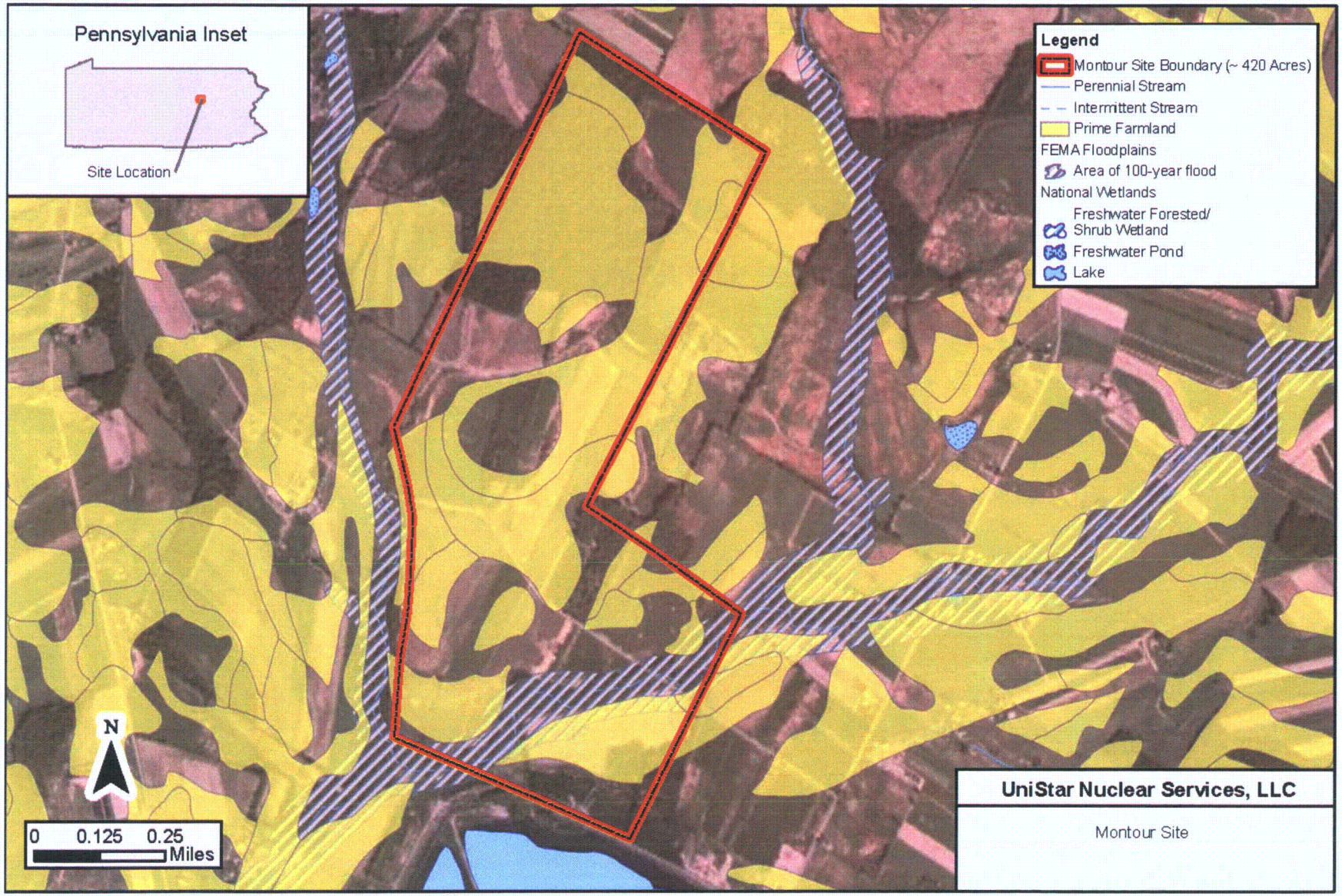
Response: Detailed maps of the proposed site, Bell Bend, and three alternative sites (Humboldt, Montour, and Seedco) follow. Please note the following in reference to these maps:

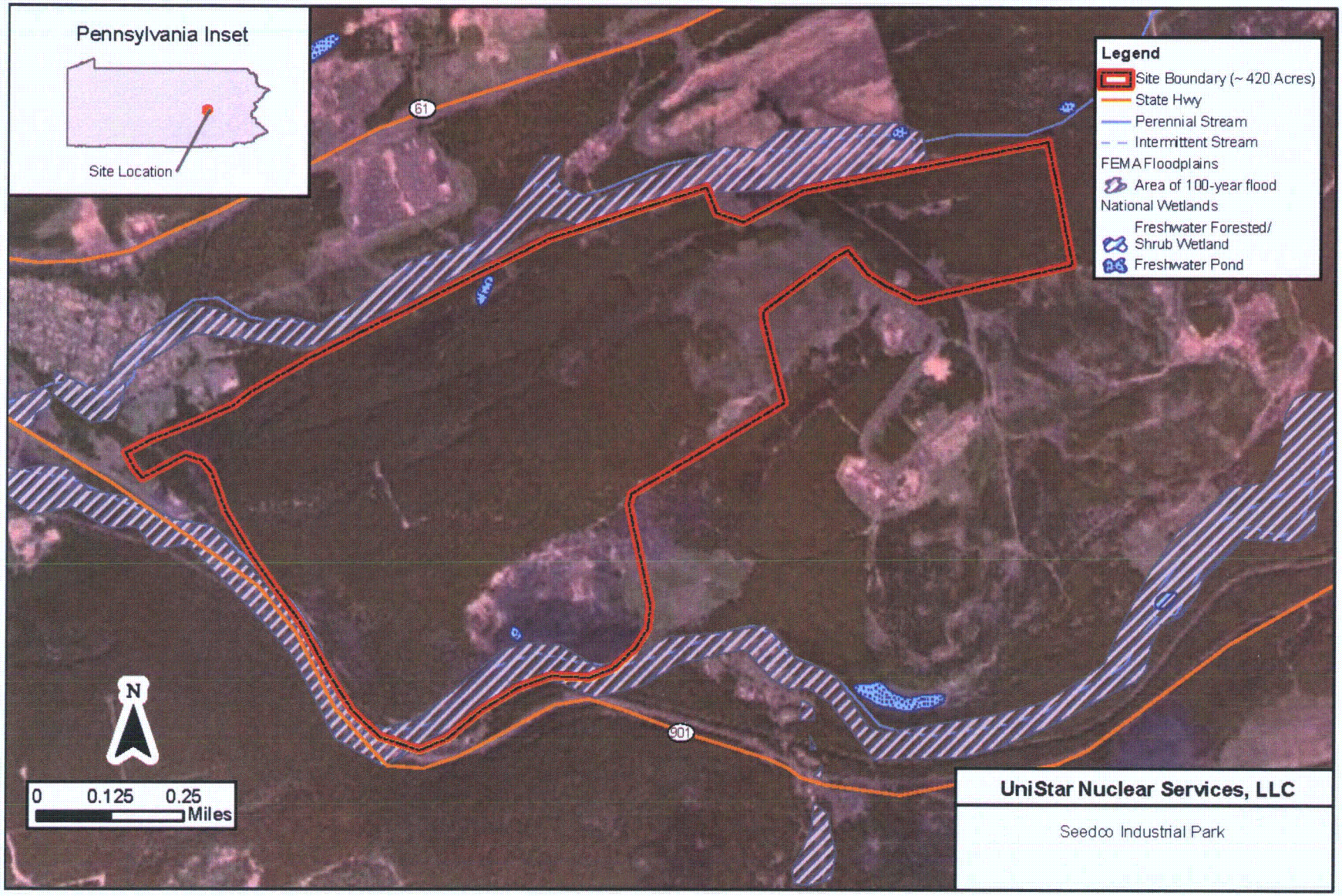
- There is no designated prime farmland within the Seedco site or surrounding area shown in the figure.
- There are no mapped National Wetlands Inventory wetlands within the Montour site.
- The 500-year floodplain has no additional areal extent beyond the 100-year floodplain for Montour, Humboldt and Seedco (i.e., 100-year and 500-year floodplain for those 3 sites are the same). For BBNPP, there are a couple of small areas that are impacted by the 500-year floodplain beyond the extent of the 100-year floodplain. Therefore, that figure shows a legend symbol for the additional area between 100-yr and 500-yr floodplain but the symbol does not represent the extent of the 500-yr floodplain--just the additional area between the two floodplains.

COLA Impact:
No changes to the BBNPP COLA are required as a result of this RAI response.


Pennsylvania Inset
Site Location
N
0 0.25 0.5
Miles
Legend
BBNPP Property Boundary
BBNPP Site Boundary (~420 Acres)
US Hwy
State Hwy
Perennial Stream
Intermittent Stream
Prime Farmland
FEMA Floodplains
Area of 100-year flood
Areas between limits of 100-yr and 500-yr floodplains
National Wetlands
Freshwater Forested/ Shrub Wetland
Freshwater Pond
Freshwater Emergent Wetland
11
UniStar Nuclear Services, LLC
BBNPP Site


Pennsylvania Inset
Site Location
Legend
Site Boundary (~ 420 Acres)
State Hwy
Perennial Stream
Intermittent Stream
Prime Farmland
FEMA Floodplains
Area of 100-year flood
National Wetlands
Freshwater Forested/ Shrub Wetland
Freshwater Pond
Lake
924
N
0 0.125 0.25 Miles
UniStar Nuclear Services, LLC
Humboldt Industrial Park


Pennsylvania Inset
Site Location
Legend
Montour Site Boundary (~ 420 Acres)
Perennial Stream
Intermittent Stream
Prime Farmland
FEMA Floodplains
Area of 100-year flood
National Wetlands
Freshwater Forested/ Shrub Wetland
Freshwater Pond
Lake
N
0 0.125 0.25 Miles
UniStar Nuclear Services, LLC
Montour Site


Pennsylvania Inset
Site Location
Legend
Site Boundary (~ 420 Acres)
State Hwy
Perennial Stream
Intermittent Stream
FEMA Floodplains
Area of 100-year flood
National Wetlands
Freshwater Forested/ Shrub Wetland
Freshwater Pond
61
901
N
0 0.125 0.25 Miles
UniStar Nuclear Services, LLC
Seedco Industrial Park

AE 2.3-1

ESRP 2.3-1

Summary: *Provide physical descriptions of and clarify differences between the hydrology and aquatic ecology sections for*

- *Unnamed Tributaries 1, 2, and 3; their correct locations, flow frequency (perennial, intermittent), flow paths, and drainage areas*
- *East Fork of Walker Run; its location, drainage area, relationship to mainstem Walker Run or other resources on or near the site*
- *all onsite ponds; the numbers, names, locations, and hydrological descriptions*

Full Text: The ER hydrology and aquatic ecology sections specify different numbers of waterbodies on the site and use different names for apparently identical waterbodies or the same names for apparently different water bodies on the site.

Response:

First Bullet:

Clarifications are provided as follows:

- Revised ER Figure 2.3-3 (in the COLA Impact section) shows locations of the perennial streams and ponds in the vicinity of the BBNPP. Note that the revised ER Figure 2.3-3 includes a specific legend entry for "Perennial Streams" and a legend entry for "Lake/Pond". ER Figure 2.3-3 also identifies the drainage area for each of the subbasins in the Walker Run watershed. These subbasins and the drainage areas are as follows: Subbasin SB-A1 (0.98 mi^2), Subbasin SB-A2 (2.43 mi^2), and Subbasin SB-A3 (0.68 mi^2). Unnamed Tributary Nos. 1 and 2 are part of Subbasin SB-A3 as shown in revised Figure 2.3-3.

- ER Figure 2.4-3 (in the COLA Impact section) has been marked to illustrate proposed changes to the Figure. The proposed changes clarify the location of streams and ponds discussed in ER Section 2.3.1.

- Table 1 shows seasonal measured stream flow rates (locations are shown in ER Figure 2.3-3).

- Table 2 identifies the differences between ER Section 2.3.1 and ER Section 2.4.2 regarding waterbodies and streams.

Physical descriptions of the hydrology for the vicinity including correct locations, flow frequency (perennial, intermittent), flow paths, and drainage areas for Unnamed Tributaries 1, 2, and 3 are as follows:

Walker Run and Unnamed Tributary No. 1

Walker Run flows toward the south until it enters the Susquehanna River at approximately River Mile 164. Walker Run is a perennial stream which collects runoff from the area surrounding the BBNNP site (Figure 2.3-3). The drainage area for the Walker Run watershed is approximately 4.10 mi^2 (10.60 km^2). Walker Run has a difference in elevation of approximately 450 ft (137 m) over its entire length with an overall slope of 1.95% (Table 2.3-1).

Unnamed Tributary No. 1, also a perennial stream, flows along the eastern and southern site boundaries of BBNPP and discharges into Walker Run on the southwest side of the site (Figure 2.3-3). This unnamed tributary has a drainage area of about 0.68 mi^2 (1.76 km^2) and an approximate length of 2.1 mi (3.4 km) with an overall slope of 3.06% (Table 2.3-1).

Unnamed Tributary No. 2

Unnamed Tributary No. 2 is a perennial stream which flows southeastward from the BBNPP site and empties into Unnamed Tributary No. 1 (Figure 2.3-3). Its drainage area is part of Unnamed Tributary No. 1.

Unnamed Tributary No. 3

Unnamed Tributary No. 3 is a perennial stream which flows southeastward from the BBNPP site and empties into the Susquehanna River at about 0.8 mi (1.3 km) upstream from the Walker Run confluence (Figure 2.3-3). Its drainage area is not part of the Walker Run watershed.

Second Bullet:

Clarifications are provided as follows:

- ER Section 2.4.2 discusses a stream termed the "East Fork of Walker Run." The stream is the same as that termed the "Unnamed Tributary No. 1" in ER Section 2.3.1. Refer to Table 2 which identifies this difference.

- The physical description of the East Fork of Walker Run is the same as that for Unnamed Tributary No. 1. Refer to the response to **First Bullet**.

Third Bullet:

Clarifications are provided as follows:

- Table 2 identifies the differences between ER Section 2.3.1 and ER Section 2.4.2 regarding terminology for ponds and streams.

- Ponds in the vicinity of the site are identified on Figure 2.3-3.

TABLE 1
BBNPP SURFACE WATER FLOW MEASUREMENTS (1)

LOCATION(2)	DATE	TOTAL WIDTH (FT)	AVG. DEPTH (FT)	AVG. MEAN VELOCITY (FT/SEC)	TOTAL DISCHARGE (FT^3/SEC)
G1 Walker Run	1/30/2008	11.00	0.70	0.42	3.254
	2/29/2008	12.08	0.95	0.33	3.820
	4/15/2008	11.25	0.87	0.33	3.244
	5/20/2008	12.00	0.84	0.40	4.025
	7/24/2008	11.00	0.64	0.26	1.859
	10/3/2008	9.50	0.53	0.10	0.494
G2 Walker Run	1/30/2008	8.00	0.71	0.69	3.947
	2/29/2008	8.00	0.68	0.56	3.014
	4/15/2008	9.33	0.71	0.67	4.421
	5/20/2008	10.00	0.68	0.77	5.190
	7/24/2008	8.00	0.51	0.75	3.080
	10/3/2008	6.00	0.78	0.16	0.742
G3 UT No. 1	1/30/2008	1.40	0.18	0.14	0.035
	2/29/2008	3.00	0.23	0.38	0.259
	4/15/2008	2.75	0.13	0.47	0.174
	5/20/2008	3.00	0.33	0.19	0.185
	7/24/2008	5.20	0.32	0.17	0.291
	10/3/2008	2.00	0.08	0.01	0.001
G4 Pond 8 Discharge	1/30/2008	0.50	0.70	0.06	0.019
	2/29/2008	2.00	0.48	0.75	0.713
	4/15/2008	3.00	0.32	0.33	0.311
	5/20/2008	4.00	1.27	0.03	0.143
	7/24/2008	4.00	0.78	0.05	0.153
	10/3/2008	3.00	0.60	0.01	0.019
G5 UT No. 3	1/30/2008	3.00	0.28	0.20	0.173
	2/29/2008	4.00	0.30	0.42	0.499
	4/15/2008	4.75	0.29	0.39	0.530
	5/20/2008	NR	NR	NR	0.012
	7/24/2008	4.50	0.33	0.18	0.261
	10/3/2008	1.50	0.20	0.01	0.003
G10 Walker Run	1/30/2008	4.50	0.33	0.28	0.423
	2/29/2008	11.00	0.96	0.58	6.128
	4/15/2008	10.50	0.33	1.79	6.094
	5/20/2008	12.00	0.96	0.72	8.242
	7/24/2008	13.00	0.92	0.33	3.917
	10/3/2008	10.00	0.57	0.13	0.767
G11 Pipe Discharge UT No. 2	1/30/2008	NR	NR	NR	0.100
	2/29/2008	NR	NR	NR	0.132
	4/15/2008	NR	NR	NR	0.087
	5/20/2008	NR	NR	NR	NR
	7/24/2008	NR	NR	NR	NR
	10/3/2008	NR	NR	NR	0.005

LOCATION[2]	DATE	TOTAL WIDTH (FT)	AVG. DEPTH (FT)	AVG. MEAN VELOCITY (FT/SEC)	TOTAL DISCHARGE (FT^3/SEC)
G12 UT No. 1	1/30/2008	NR	NR	NR	NR
	2/29/2008	4.00	0.30	0.39	0.473
	4/15/2008	NR	NR	NR	NR
	5/20/2008	NR	NR	NR	NR
	7/24/2008	4.00	0.23	0.13	0.125
	10/3/2008	3.00	0.20	0.02	0.014
G13 Walker Run	1/30/2008	10.00	0.66	0.95	6.299
	2/29/2008	10.00	1.12	0.44	4.975
	4/15/2008	12.33	0.95	0.42	4.937
	5/20/2008	12.00	1.21	0.40	5.816
	7/24/2008	11.00	1.42	0.16	2.518
	10/3/2008	10.00	1.07	0.06	0.621

(1) Measurements were performed using cross-sectional depth and velocity profiling method, except G11 which was measured using a bucket and watch.

(2) Refer to ER Figure 2.3-33 for gauging locations.

TABLE 2
DIFFERENCES BETWEEN ER SECTION 2.3.1 (HYDROLOGY) AND ER SECTION 2.4.2 (AQUATIC ECOLOGY)

	ER 2.3.1.1 (FIG 2.3-3 AND 2.3-33) REV. 1	ER 2.4.2.1 (FIG. 2.4-3) REV. 1
STREAMS	Walker Run	Walker Run
	Unnamed Tributary No. 1	East Fork Walker Run (not shown in Fig 2.4-3 but mentioned in the text)
	Unnamed Tributary No. 2	Not mentioned
	Unnamed Tributary No. 3	Not mentioned
PONDS	G6	Johnson's Pond
	G7	Beaver Pond
	G8	Farm Pond
	G9	Unnamed Pond 1
	Not mentioned	Unnamed Pond 2
	Not mentioned	West Building Pond
STREAM GAUGES	G1	Walker Run 6
	G2	Walker Run 1
	G3	Not mentioned
	G4	Not mentioned
	G5	Unnamed Tributary 3
	G10	Not mentioned
	G11	Walker Run 3
	G13	Walker Run 4
	G12	Not mentioned
	Not mentioned	Walker Run 2
	Not mentioned	Walker Run 5
	Not addressed (outside Walker Run Watershed)	Unnamed Tributary No. 2
	Not addressed (outside Walker Run Watershed)	Unnamed Tributary No. 3

COLA Impact:
The BBNPP COLA FSAR and ER will be revised as follows in a future COLA revision:

Environmental Report

2.3.1.1 Surface Water Resources

The BBNPP site is covered by glacial deposits and was subjected to both glacial and periglacial events during the Quaternary Epoch. Underneath this glacial overburden lies Devonian bedrock. Erosion and down cutting from the Susquehanna River and its tributary streams have dissected the overburden, leaving many exposed bedrock outcrops throughout the site area. Topographic relief within a 5 mi (8 km) radius around the BBNNP site varies from just under 500 ft (152 m) mean sea level (msl), on the floodplain of the NBSR, to a maximum of approximately 1,560 ft (476 m) msl. Thus, the topographic relief within 5-mile (8 km) radius is approximately 1,060 ft (323 m).

The NBSR flows from north to south past the SSES, makes a broad, 90 degree angle turn (i.e., Bell Bend) to the west, and flows to the south of the BBNPP site before reaching Berwick, PA. The proposed BBNPP CWS Makeup Water Intake Structure site is approximately 22 mi (35 km) downstream of Wilkes-Barre, PA and 5 mi (8 km) upstream of Berwick, PA. The NBSR ultimately receives all surface water and groundwater that drains from the BBNNP site.

An east-west trending ridge lies just to the north of the BBNPP and Beach Grove Road. Small streams drain from the ridge top and flow southward toward the NBSR. Walker Run is a relatively small stream, but is the largest in the immediate vicinity of the BBNPP. Walker Run flows southward along the western side of the BBNPP, and has a gradient drop from upstream (referred in Table 2.3-1 as Upper Walker Run) to downstream (referred as Lower Walker Run in Table 2.3-1) of almost 290 ft (88 m) over a distance of approximately 4 mi (6 km). The East Fork of~~An unnamed tributary~~ Walker Run (Unnamed Tributary No. 1) shown in Figure 2.3-3 ~~as Unnamed Tributary No. 1~~ flows along the eastern and southern site boundaries and enters Walker Run on the southwest side of the site. A second ~~unnamed~~ tributary shown in Figure 2.3-3 ~~as~~(Unnamed Tributary No. 2) flows east from the BBNPP site and empties into the Unnamed Tributary No. 1. The Walker Run watershed (Figure 2.3-3) has a drainage area of 4.10 mi^2 (10.6 km^2). Based on the runoff of these streams, the Walker Run watershed can be divided into three sub-basins (A1, A2, and A3) as illustrated in Figure 2.3-3.

2.3.1.1.1.3 Gauging Stations

There is no gauging station within the Walker Run watershed. The NBSR gauging stations in Pennsylvania that gauge both surface water elevation and water flow, and are located close to the BBNPP site, include the United States Geological Survey (USGS) gauging stations at Wilkes-Barre, PA (Station No. 01536500), and Danville, PA (Station No. 01540500). These stations are located upstream and downstream of the proposed BBNPP intake structure, respectively (Figure 2.3-7).

The Wilkes-Barre gauging station is located approximately 22 mi (35 km) upstream from the proposed BBNPP intake structure. Streamflow records have been recorded at that location since April 1899 (USGS, 2008b). The drainage area of the NBSR at Wilkes-Barre is approximately 9,960 mi^2 (25,796 km^2) (USGS, 2008b) and the average annual flow calculated from the mean daily streamflow data recorded at the second USGS gauging station for a 108-year period (1899-2000) is 13,641 cubic feet per second (cfs) (386 cubic meters per second (m^3/s)) (USGS, 2008i). At Wilkes-Barre the maximum streamflow was recorded on June 24,

1972 as 345,000 (9,769 m^3/s) (USGS, 2008b) and the daily minimum streamflow was recorded on September 27, 1964 as 532 cfs (15.1 m^3/s) (USGS, 2008p). The maximum flood level was recorded on June 24, 1972 as 40.91 ft (12.47 m) (USGS, 2008b). Temperature data has not been recorded for this station.

The USGS gauge at Danville, PA (Station No. 01540500) is located approximately 28 mi (45 km) downstream from the BBNPP intake structure, and has been in continuous operation since April 1905 (USGS, 2008a). The drainage area of the NBSR at Danville is approximately 11,200 mi^2 (29,060 km^2) (USGS, 2008a). The average annual flow calculated from the mean daily data recorded during the 102-year period (1905-2006) is 15,483 cfs (438 m^3/s) (USGS, 2008k~~a~~). At Danville, the maximum streamflow was recorded on June 25, 1972 as 363,000 cfs (10,279 m^3/s) (USGS, 2008a). The daily minimum streamflow was recorded on September 24th, 25th, and 27th, 1964 as 558 cfs (15.8 m^3/s) (USGS, 2008o~~h~~). The maximum flood level was recorded on June 25, 1972 as 32.16 ft (9.8 m) (USGS, 2008a).

2.3.1.1.1.4 Walker Run and Unnamed Tributary No. 1

Walker Run, a perennial stream, flows toward the south until it enters the NBSR at approximately River Mile 164. Walker Run collects runoff from the area surrounding the BBNNP site (Figure 2.3-3). The drainage area for the Walker Run watershed is approximately 4.10 mi^2 (10.60 km^2). Walker Run has a difference in elevation of approximately 450 ft (137 m) over its entire length with an overall slope of 1.95% (Table 2.3-1).

Unnamed Tributary No. 1 (East Fork of Walker Run) flows along the eastern and southern site boundaries of BBNPP and discharges into Walker Run on the southwest side of the site (Figure 2.3-3). The Unnamed Tributary No. 1 has a drainage area of about 0.68 mi^2 (1.76 km^2) and an approximate length of 2.1 mi (3.4 km) with an overall slope of 3.06% (Table 2.3-1).

2.3.1.1.1.5 Unnamed Tributary No.2

A second ~~unnamed~~ perennial tributary flows southeastward from the BBNPP site and empties into the Unnamed Tributary No. 1 (East Fork of Walker Run) (Figure 2.3-3). Its drainage area is part of the ~~Walker Run watershed~~ Unnamed Tributary No. 1.

2.3.1.1.1.6 Unnamed Tributary No. 3

A third ~~unnamed~~ perennial tributary flows southeastward from the BBNPP site and empties into the NBSR about 0.8 mi (1.3 km) upstream from the Walker Run confluence (Figure 2.3-3). Its drainage area is not part of the Walker Run watershed.

2.3.1.1.1.8 Bathymetry of the North Branch of the Susquehanna River (NBSR)

The bathymetry of the NBSR near the proposed intake is illustrated in Figure 2.3-11. ~~Riverbed elevations~~Depth contours in the vicinity of the CWS Makeup Water Intake Structure range from ~~473 to 484~~ 0 to 4 ft (~~144 to 148~~ 0 to 1.2 m) ~~msl~~ (Figure 2.3-11). The CWS Makeup Water Intake Structure will draw water from the NBSR from approximately 1 ft (0.3 m) below the design basis low water level elevation 484 ft (148 m) msl, as shown in Figure 3.4-5. The bathymetry of the NBSR will not be significantly affected by the intake system.

The discharge line discussed in Section 3.4.2.2 and illustrated in Figure 3.4-6 shows that the 28- 4 in (10 cm) diameter port holes are located on top of the pipe at approximately elevation

476 ft (145 m) msl. The NBSR bottom ~~elevation~~ depth where the pipe discharges ~~is at elevation 474 ft (144.5 m) msl~~ ranges between 8 to 12 ft (3.7 to 5.5 m) (Figure 2.3-11).

Information on circulation patterns and velocity vectors in the vicinity of the proposed discharge outfall is described in Section 5.3.

2.3.1.1.1.9 Floodplain of the North Branch of the Susquehanna River (NBSR)

The elevation of the NBSR, 100-year floodplain near the BBNPP River intake structure is approximately 514 ~~513~~ ft (157 ~~156~~ m) msl (FEMA, 2008) and the floodplain illustrated in Figure 2.3-13 and Figure 2.3-14, is approximately 0.44 mi (0.71 km) wide in this area. Figure 2.3-15 shows that the predicted Susquehanna River flooding that will occur during a 500-yr recurrence interval extends up to elevation 514 ft (157 m) msl near the CWS Makeup Water Intake Structure. Figure 2.3-13 and Figure 2.3-14 show the 100-yr and 500-yr Susquehanna River flooding impacts in the vicinity of the BBNPP. The BBNPP plant grade elevation will be 674 ft (205 m) msl, thus the BBNPP site is approximately 161 ft (49 m) above the NBSR 100-year floodplain and 174 ft (53 m) above the nominal river level.

2.3.1.2.2.10 Fluctuations in Groundwater Elevations

Water contained in aquifers is derived from surface infiltration and recharge processes. The amount of rise and fall in groundwater elevations is reflective of the annual cycles of recharge. During periods of low rainfall and high ET, groundwater continues to flow toward streams, ponds, wetlands, wells, and other points of discharge. Low rates of recharge and increased ET will cause groundwater levels to gradually decline. Groundwater elevations typically decline in summer and fall, when precipitation rates are at their annual low and ET rates are at their greatest.

The effective porosity of the aquifer also affects groundwater elevation. Aquifers with large effective porosities store more water. As a result, more ET or other stresses (such as pumping wells) on these aquifers have less of an effect on the groundwater elevations. Bedrock aquifers with low primary porosity and permeability characteristics do not store a lot of water. As a result, low recharge rates or high rates of groundwater removal will cause water levels in these aquifers to fluctuate more quickly and the magnitude of fluctuations is usually greater.

The USGS monitors groundwater elevations in select monitoring wells across the Commonwealth of Pennsylvania. Hydrographs of four example monitoring wells located in Luzerne County are presented in Figure 2.3-30 and Figure 2.3-31 (USGS, 2008j)(USGS, 2008q)(USGS, 2008r)(USGS, 2008s). Hydrographs for two wells screened in the glacial outwash (Figure 2.3-30) show that annual fluctuations of water levels were approximately 8 to 14 ft (2.4 to 4.3 m). In general, the highest groundwater levels in these two wells also occurred in the winter and spring months each year. Hydrographs for two wells screened in the Catskill Formation (Figure 2.3-31) show that annual fluctuations of water levels were approximately 6 to 8 ft (1.8 to 2.4 m). The highest groundwater levels generally occurred in the winter and spring months each year.

2.3.1.2.3 Local and Site-Specific Hydrogeologic Descriptions

The locations of monitoring wells are presented on Figure 2.3-32. The wells were located in order to provide adequate distribution with which to determine site groundwater levels, subsurface flow directions, and hydraulic gradients beneath the site. Well clusters were installed at selected locations to determine vertical gradients. Monthly water levels were

measured in monitoring wells from October 2007 through ~~October~~September 2008 (Table 2.3-20). Water level elevations were also measured monthly in four ponds and seven stream locations. The surface water monitoring locations are shown on Figure 2.3-33. Surface water elevation data are tabulated in Table 2.3-22. The water levels in the four ponds are assumed to be continuous with the local water table in the glacial overburden, and have been used to construct the potentiometric surfaces for the Glacial Overburden aquifer.

2.3.1.2.3.1 Geohydrology

The elevations, thicknesses, and descriptions of the geological materials comprising the geological strata encountered to depths up to 600 ft (180 m) bgs were determined from the BBNPP geotechnical and hydrogeological borings. Geotechnical and geological descriptions of the material encountered at the BBNPP site are described in Section 2.6.

Glacial Overburden Aquifer

The Glacial Overburden aquifer consists almost entirely of sand and gravel deposited during the Pleistocene Epoch. These deposits include stratified kame, kame terrace, and outwash, as well as unstratified ground moraine, end moraine, and colluvial deposits. On the upland terrace occupied by the BBNPP and SSES, the glacial deposits are 0 to 100 ft (0 to 30 m) thick. Figure 2.3-37 presents a map showing the saturated thickness of the glacial overburden for the entire BBNPP site. The greatest thickness of overburden at the BBNPP site (approximately 60 ft (18 m)) occurs along Beach Grove Road on the north side of the site (at monitoring well MW305B) and southeast of the power block area at monitoring well MW313B).

At the SSES, kame and glacial outwash deposits are up to 100 ft (30 m) thick near the north and eastern sides of the Spray Pond. There is an elongated trough of glacial deposits that trends east-west and parallels Beach Grove Road. This channel thins to the west near the MW303 monitoring well cluster. The trough drops in elevation as it passes eastward through the SSES property. SSES production wells TW-1 and TW-2 are screened in this elongated wedge of glacial sand and gravel. This trough is shown on Figure 2.3-38, which displays the topography of bedrock erosional surface. The "northern trough" probably represents an outwash channel that was deeply eroded by glacial meltwater as the Wisconsinan glacier advanced, and was filled by outwash, kame, and moraine deposits as the glacier overrode the site and then retreated. The northern trough drops in elevation to the east and empties into the Susquehanna River Valley deposit.

A second trough of thick glacial sand and gravel deposits starts near Confers Lane Road (County Road T-438), trends west-southwest, and passes through the southern edge of the BBNPP power block area (Figure 2.3-38 and Figure 2.3-39). As mentioned previously, the greatest thickness of glacial sand and gravel deposits has been measured in the "southern trough" at monitoring well MW313C.

The northern trough (Figure 2.3-38) is bounded on the north side by Beach Grove Road and the ridge to the north formed by Trimmers Rock Formation (resistant siltstone and sandstone). The northern trough is separated from the southern trough by a series of hills which represent Mahantango Formation bedrock highs. This series of hills paralleling the bedrock strike represents the more resistant Tully Limestone Member that is found at the top of the Mahantango Shale. These hills include the bedrock high that occurs below the CWS cooling towers at the SSES, the two hills on the northern side of the BBNPP site (location of the BBNPP cooling towers and apple orchard), and another hill located directly west of the BBNPP CWS

cooling towers on the west side of Walker Run. These hills are dissected by small creeks and drainages that run north to south. Walker Run flows through the western notch that separates the hills on the BBNPP site from the hill located west of Walker Run (Figure 2.3-38). The~~A~~ southward-flowing, East Fork of Walker Run (Unnamed Tributary No. 1) flows through the eastern notch that separates the two BBNPP hills from the SSES bedrock high. The SSES West Building lies in the bedrock low that separates the SSES bedrock high from the BBNPP bedrock hills (Figure 2.3-38).

2.3.1.2.3.2 Observation Well Data and Subsurface Pathways

Water level data measured from groundwater observation wells and surface staff gauges installed for the BBNPP site were used to:

- Develop groundwater potentiometric surface maps,
- Determine groundwater flow directions (horizontal and vertical) and hydraulic gradients,
- Evaluate short-term and seasonal changes in surface water and groundwater elevations and gradients,
- Identify areas of potential groundwater recharge and discharge, and
- Calculate flow velocities of groundwater.

A total of 41 observation wells with depths extending to 400 ft (120 m) bgs were installed in September and October 2007 (except MW301 C, which was installed in May 2008). Observation wells were installed in three different groundwater-bearing intervals (Table 2.3-18):

- 14 wells were screened in the Glacial Overburden aquifer at depths of 9.2 to 76.0 ft (2.8 to 23.2 m) bgs ("A" wells),
- 19 wells were screened in shallow shale bedrock 50 to 181 ft (15 to 55 m) bgs ("B" wells, including MW313C, and excluding MW302B and MW307B), and
- 8 wells were screened in the Deep Shale Bedrock aquifer at 170 to 400 ft (52 to 122 m) bgs ("C" wells, excluding MW313C, and including MW302B and MW307B).

The Glacial Overburden aquifer is distinctly different than the shale bedrock aquifer. The shale bedrock aquifer has been divided into "shallow" and "deep" bedrock aquifer, as a means to determine if the hydraulic properties, the hydraulic potentials, or the groundwater flow directions are different between the shallow and deeper shale bedrock. In other words, the division of "shallow" versus "deep" provides a means to evaluate groundwater flow characteristics in the bedrock in three dimensions, rather than two dimensions. A depth of 175 ft (53 m) bgs has been selected as the division between the "Shallow" and "Deep" Bedrock aquifers.

Monitoring well locations are shown in Figure 2.3-32. A total of 31 monitoring wells were installed at the first 10 drilling locations (MW301 -MW31 0), thereby creating 10 well clusters. Well clusters are a series of wells placed at the same location, with each well installed in a different water-bearing interval. Each cluster consists of two or more wells. This was done in

order to measure vertical differences in hydraulic head, vertical hydraulic gradients, and vertical differences in hydraulic conductivity.

Water level measurements in monitoring well MW311 C indicate that the well was very slow to recover after the initial installation and development. The water level measurements from this well indicate that the water level rose very slowly and does not correspond to other water levels measured in the vicinity. Accordingly, the groundwater elevation maps, flow directions, and flow rates presented below do not consider data from this well.

The geotechnical borehole B301, corresponding to Monitoring Well MW301 C, was drilled in September 2007, but was left as an open borehole until geophysical testing could be completed. The well (MW301 C) was not installed until May 2008. As a result, measurements of water levels in this well became available starting in May 2008.

Between October 2007 and September 2008, water levels in the monitoring wells were measured monthly to characterize seasonal trends in groundwater levels, flow directions, and hydraulic gradients for the BBNPP site (Figure 2.3-40 through Figure 2.3-44). In addition, pressure transducers were installed in six monitoring wells and two surface water monitoring stations between April and September 2008 to evaluate short-term fluctuations in the water level (Figure 2.3-45 and Figure 2.3-46). The following groundwater potentiometric surfaces, hydraulic gradients, and temporal trends are based on these data.

Glacial Overburden Aquifer

Surface water and groundwater flows from north to south through the notches between the hills located on the south side of Beach Grove Road. Walker Run flows southward through the "western notch" and the East Fork of~~unnamed tributary of~~ Walker Run (Unnamed Tributary No. 1) flows through the "eastern notch" (Figure 2.3-38). Groundwater elevations measured in the Glacial Overburden aquifer are tabulated in Table 2.3-20. In addition, elevations for four ponds (Table 2.3-22) have been used to map the water table surface in the Glacial Overburden aquifer.

The data exhibit temporal variability in groundwater elevations during the observation period (October 2007 to September 2008). Groundwater elevations versus time for the ten well clusters are plotted in Figure 2.3-40 through Figure 2.3-44. A seasonal influence during this monitoring period was observed: groundwater elevation lows generally occurred in fall (October and November 2007), followed by gradually increasing levels in winter, peak groundwater elevations in February and March 2008, and decreasing groundwater elevations in April through September 2008.

For the Glacial Overburden monitoring wells, the lowest elevations generally occurred in October 2007 and the highest elevations occurred in February and March 2008. The differences between the annual high and low elevations for each well ranged from 1.67 to 6.31 ft (0.51 to 1.92 m). The greatest annual variations occurred in the MW302 cluster and MW309A. Less than 5 ft (1.5 m) of variation occurred in each of the other Glacial Overburden wells.

The monthly groundwater elevation data (Table 2.3-20) and the monthly surface water elevation data for four ponds (Table 2.3-22) were used to develop groundwater elevation contour maps for the Glacial Overburden aquifer. These maps are presented for October 2007 (fall), January 2008 (winter), and March 2008 (spring), and July 2008 (summer) (Figure 2.3-47 through Figure 2.3-50 respectively).

Groundwater levels measured in MW303A are the highest measured anywhere in the Glacial Overburden aquifer. MW303A is located near a surface water and groundwater divide in the northern trough of the Glacial Overburden aquifer (Figure 2.3-47 through Figure 2.3-50). Groundwater in the glacial overburden near this point flows either westward toward Walker Run or flows eastward toward the SSES Spray Pond area. Some groundwater in the northern trough along with surface water in the unnamed tributary flows southward through the eastern bedrock notch and enters the southern trough (Figure 2.3-47 through Figure 2.3-50).

In the southern trough (where the BBNPP power block is located), groundwater in the glacial overburden is flowing from east to west and then southwest (Figure 2.3-47 through Figure 2.3-50). In October 2007 (month of lowest groundwater levels), the highest groundwater level in the southern trough (668.74 ft (203.88 m) msl) was measured in well MW304A. The lowest water level (653.86 ft (199.35 m) msl) was measured in Farm Pond (G8). Thus, a total head loss of nearly 15 ft (4.6 m) occurred across the southern trough in October 2007 (Figure 2.3-47). Between October 2007 and March 2008, the groundwater levels in all wells increased approximately 3.4 to 5.5 ft (1.1 to 1.7 m). In March 2008 (month of highest groundwater levels), the highest groundwater level in the southern trough was again located in MW304A (672.16 ft (204.93 m) msl) and the lowest level was again recorded in Farm Pond (G8) (654.30 ft (199.48 m) msl) (Figure 2.3-49). In March 2008, the total head loss across the southern trough (from MW304A to Farm Pond (G8)) was approximately 18 ft (5.5 m).

A ridge of bedrock separates the southern trough from monitoring wells MW307A and MW309A. Groundwater in the Glacial Overburden aquifer in this area belongs to a separate flow system, which flows south and southeast and discharges to Unnamed Tributary No. 2, a drainage system altogether separate from the Walker Run watershed (Figure 2.3-47 through Figure 2.3-50).

Horizontal hydraulic gradients have been calculated for several flowpaths in the Glacial Overburden aquifer (Table 2.3-23). Flowpath GO1 goes from MW304A to MW302A1; Flowpath GO2 goes from MW302A1 to MW301 A, and Flowpath GO3 goes from MW301 A to Farm Pond (G8) (Figure 2.3-47 through Figure 2.3-50). Together, these three flowline segments represent a flowline down the center of the southern trough, from east to west. Segment GO3 represents the horizontal flowline between the center of the power block and Farm Pond (G8). The horizontal hydraulic gradients computed for the southern bedrock trough are listed in Table 2.3-23 for fall (October 2007), winter (January 2008), spring (March 2008), and summer (July 2008) conditions. The largest gradients (0.0030 to 0.0112 ft/ft) generally occurred in March 2008 (spring), when the groundwater elevations were highest. The gradient between the power block and Farm Pond (G8) (Pathline GO3) was lowest in October 2007 (0.0041 ft/ft) and highest in March 2008 (0.0112 ft/ ft).

The Glacial Overburden aquifer discharges as springs and seeps into Farm Pond (G8), the wetlands along the southern border of the BBNPP site, and into Walker Run. In February 2008, the surface of Johnson's Ponds (G6), Beaver Pond (G7), and Unnamed Pond 1 (G9) were all frozen with a layer of 2 to 3 inches of ice. However, no ice was present on the surface of Farm Pond (G8), indicating that warm groundwater was discharging into the pond during winter. In addition, Farm Pond (G8) discharges water all year long, even in the extremely dry summer and fall months, which also indicates that this pond is fed by groundwater discharge. As the southern bedrock trough approaches Farm Pond (G8) and surface water gauging stations G2 (Walker Run 1) and G13 (Walker Run 4) ~~on Walker Run~~ (Figure 2.3-33), the trough becomes constricted and the glacial overburden thins considerably. As a consequence, groundwater flowing southeastward is forced to the surface in various

locations near Farm Pond (G8) and the wetlands south and southwest of Farm Pond (G8). This area is considered a groundwater discharge area for the Glacial Overburden aquifer.

2.3.1.2.3.3 Hydrogeologic Properties

Shale Bedrock Aquifer

Over 50 packer tests have been performed in the shale bedrock at the SSES site (PPL, 1999c).~~(Table 2.3-27); the~~These tests yielded Kh values that ranged from 0 to 0.85 ft/day (0 to 3.00E-04 cm/s) (Table 2.3-28). The median value for the 41 tests performed by the railway bridge (northeast of SSES site) was 0.22 ft/day (7.76E-05 cm/s). The packer test values encountered at the SSES site were greater than the packer test results encountered at the BBNPP site and generally approached the BBNPP values calculated for the MW301 B1 pumping test.

2.3.1.2.3.4.1 Glacial Overburden Aquifer

In the vicinity of the BBNPP site, the Glacial Overburden aquifer is the most capable aquifer for transmitting groundwater, and it is the source aquifer for many wells and springs in the county.

The groundwater travel time in the Glacial Overburden aquifer was calculated from Monitoring Well MW301 A, located near the center of the BBNPP power block area, to a projected discharge point in the relocated Walker Run that is approximately 1,200 ft (370 m) southwest of Monitoring Well MW301 A. An average horizontal groundwater velocity of 4.25 ft/day (1.30 m/day) was calculated using a median horizontal hydraulic gradient of 0.0081 ft/ft measured between Monitoring Well MW301 A and Farm Pond (G8) (Table 2.3-23), a hydraulic conductivity of 168 ft/day (5.93E-02 cm/s), and an effective porosity of 32.2% (Table 2.3-26). Using a mean travel distance of approximately 1,200 ft (370 m) from Monitoring Well MW301 A to a projected discharge point in ~~the relocated~~ Walker Run, the groundwater travel time was estimated to be about 282 days.

2.3.1.3 References

Sevon, 1997. Glacial Deposits of Pennsylvania, Pennsylvania Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, Map 59. W.D Sevon and D.D. Braun, 1997.

Sevon, 2000. Physiographic Provinces of Pennsylvania, Pennsylvania Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, Map 13, ~~Regolith in the Piedmont Upland section, Piedmont Province, York, Lancaster, and Chester Counties, Southeastern Pennsylvania, Southeastern Geology, Volume 39, Number 3 and 4, p 223-241,~~ W.D. Sevon, ~~October~~ 2000.

USGS, 2008h. USGS 01540500 Susquehanna River at Danville, Website: http://nwis.waterdata.usgs.gov/pa/nwis/monthly/?referred_module=sw&site_no=01540500&por_01540500_1=1820802,00060,1,1905-04,2008-09&format=html_table&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=parameter_selection_list ~~http://waterdata.usgs.gov/nwis/nwisman/?site_no=01540500&agency_cd=USGS,~~ Date accessed: January ~~22~~25, 2008

USGS, 2008i. USGS 01536500 Susquehanna River at Wilkes-Barre, PA, Website: http://nwis.waterdata.usgs.gov/pa/nwis/monthly/?referred_module=sw&site_no=01536500&por_01536500_1=1820685,00060,1,1899-04,2008-09&format=html_table&date_format=YYYY-MM-

DD&rdb_compression=file&submitted_form=parameter_selection_list
~~waterdata.usgs.gov/nwis/nwisman/?site_no=01536500&agency_cd=USGS,~~ Date accessed: January 23, 2008

USGS, 2008j. USGS Real-Time Water Data for USGS 411800076162501 LU 243 Luzerne County Obs Well, Website:
http://nwis.waterdata.usgs.gov/nwis/dv?cb_72019=on&format=gif_default&begin_date=1960-01-01&end_date=1994-07-14&site_no=411800076162501&referred_module=sw, Date accessed: July 8, 2008 (reaccessed Aug. 3, 2009).

USGS, 2008k. USGS 01540500 Susquehanna River at Danville Daily Average Flow Data, Website:
http://nwis.waterdata.usgs.gov/pa/nwis/dvstat/?referred_module=sw&site_no=01540500&por_01540500_1=1820802,00060,1,1905-04-01,2008-09-30&format=html_table&stat_cds=mean_va&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=parameter_selection_list , Date accessed: January 25, 2008.

USGS, 2008l. USGS 01536500 Susquehanna River at Wilkes-Barre, PA Daily Average Flow Data, Website:
http://nwis.waterdata.usgs.gov/pa/nwis/dvstat/?referred_module=sw&site_no=01536500&por_01536500_1=1820685,00060,1,1899-04-01,2008-09-30&format=html_table&stat_cds=mean_va&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=parameter_selection_list , Date accessed: January 23, 2008.

USGS, 2008m. USGS 01540500 Susquehanna River at Danville Daily Maximum Flow Data, Website:
http://nwis.waterdata.usgs.gov/pa/nwis/dvstat/?referred_module=sw&site_no=01540500&por_01540500_1=1820802,00060,1,1905-04-01,2008-09-30&format=html_table&stat_cds=max_va&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=parameter_selection_list
http://nwis.waterdata.usgs.gov/pa/nwis/dvstat/?referred_module=sw&site_no=01540500&por_01540500_1=1820802,00060,1,1905-04-01,2008-09-30&format=html_table&stat_cds=mean_va&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=parameter_selection_list, Date accessed: January 25, 2008.

USGS, 2008n. USGS 01536500 Susquehanna River at Wilkes-Barre, PA Daily Maximum Flow Data, Website:
http://nwis.waterdata.usgs.gov/pa/nwis/dvstat/?referred_module=sw&site_no=01536500&por_01536500_1=1820685,00060,1,1899-04-01,2008-09-30&format=html_table&stat_cds=max_va&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=parameter_selection_list , Date accessed: January 23, 2008.

USGS, 2008o. USGS 01540500 Susquehanna River at Danville Daily Minimum Flow Data, Website:
http://nwis.waterdata.usgs.gov/pa/nwis/dvstat/?referred_module=sw&site_no=01540500&por_01540500_1=1820802,00060,1,1905-04-01,2008-09-30&format=html_table&stat_cds=min_va&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=parameter_selection_list

http://nwis.waterdata.usgs.gov/pa/nwis/dvstat/?referred_module=sw&site_no=01540500&por_01540500_1=1820802,00060,1,1905-04-01,2008-09-30&format=html_table&stat_cds=mean_va&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=parameter_selection_list, Date accessed: January 25, 2008.

USGS, 2008p. USGS 01536500 Susquehanna River at Wilkes-Barre, PA Daily Maximum Flow Data, Website: http://nwis.waterdata.usgs.gov/pa/nwis/dvstat/?referred_module=sw&site_no=01536500&por_01536500_1=1820685,00060,1,1899-04-01,2008-09-30&format=html_table&stat_cds=min_va&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=parameter_selection_list, Date accessed: January 23, 2008.

~~**USGS, 2008j**. USGS Ground-Water Daily Data for the Nation Grouped by County, Website: http://nwis.waterdata.usgs.gov/nwis/dv?referred_mod ule=gw&state_cd=42&format=station_list&sort_key=site_no&group_key=co unty_cd&sitefi le_output_format=htm l_table&column_name=agency_cd&col um n_name=site _no&col um n_name=station_n m&range_selection=days&period=365&beg i n_date=&end_dat e=&d ate_fo r m at=YYYY-M M-DD&rdb_compression=file&list_of_search_criteria=state_cd%2Crealtime_parameter_selecti o n, Date accessed: July 8, 2008.~~**USGS, 2008q. USGS Real-Time Water Data for USGS 411756076162701 LU 294 Luzerne County Obs Well, Website:** http://nwis.waterdata.usgs.gov/nwis/dv?cb_72019=on&format=gif_default&begin_date=1994-11-01&end_date=2008-07-01&site_no=411756076162701&referred_module=sw, Date accessed: July 8, 2008 (reaccessed Aug. 3, 2009).

USGS, 2008r. USGS Real-Time Water Data for USGS 411757075505801 LU 309 Luzerne County Obs Well, Website: http://nwis.waterdata.usgs.gov/nwis/dv?cb_72019=on&format=gif_default&begin_date=1967-01-01&end_date=1976-01-01&site_no=411757075505801&referred_module=sw, Date accessed: July 8, 2008 (reaccessed Aug. 3, 2009).

USGS, 2008s. USGS Real-Time Water Data for USGS 410332076115302 LU 455 Luzerne County Obs Well, Website: http://nwis.waterdata.usgs.gov/nwis/dv?cb_72019=on&format=gif_default&begin_date=1980-10-23&end_date=1982-08-23&site_no=410332076115302&referred_module=sw, Date accessed: July 8, 2008 (reaccessed Aug. 3, 2009).

Williams, 1987. Groundwater Resources of the Berwick-Bloomsburg-Danville Area, East-Central Pennsylvania, Pennsylvania Bureau of Topographic and Geologic Survey, Water Resource Report 61, J.H. Williams and D.A. Eckhardt, 1987.

2.4.2.1 On-site Waterbodies

Waterbodies at the BBNPP site are described in Section 2.3.1. The locations of the on-site surface water biological monitoring locations are provided in Figure 2.4-3. Summary descriptions of the on-site waterbodies' hydrological and physicochemical characteristics are given in Section 2.3.1. Locations of the on-site waterbody aquatic biota sampling locations are shown in Figure 2.4-3. Several of the biological monitoring stations are in close proximity to the surface water monitoring stations described in Section 2.3.1. The following indicates the biological monitoring station name and the corresponding surface monitoring station

designator used in Section 2.3.1 in parentheses: Farm Pond (G8), Unnamed Pond 1 (G9), Beaver Pond (G7), Johnson's Pond (G6), Walker Run 6 (G1), Walker Run 1 (G2),Walker Run 3 (G3).

Walker Run is a second order tributary to the Susquehanna River. It is a low to moderate gradient stream that flows through a section of the proposed BBNPP site. The main stem of Walker Run flows south through the western portion of the site and a secondary branch (east fork or Unnamed Tributary No. 1) flows west through the center of the site until its confluence with the main stem of Walker Run. Both branches are shallow and flow through a mixture of agricultural and forested lands. Unnamed Tributary ~~2~~5 is a small stream that flows in an easterly direction from near the southeastern corner of the SSES site and eventually enters Lake Took-a-While. It flows through a mixture of grasses and scrubby vegetation. Six ponds are located on the BBNPP site. Four of the ponds; West Building Pond, Unnamed Pond 1, Unnamed Pond 2, and Farm Pond; are small and shallow, averaging less than 1 ft (0.3 m) in depth. Beaver and Johnson's Pond are the largest ponds ranging up to 5 ft (1.5 m) in depth. The North Branch Division of the Pennsylvania Canal System was constructed along the Susquehanna River in 1834 and is no longer in use. On the BBNPP site, a short section of the North Branch Canal is less than 0.25 mi (0.4 km) from, and runs parallel to, the Susquehanna River. The Canal is fairly deep and steep- sided at this location.

Sampling was performed to determine the community composition of fish inhabiting the six ponds, Unnamed Tributary ~~2~~5, and Walker Run, as all potentially could be affected by construction of the plant. Five of the ponds (excluding Unnamed Pond 2) and Walker Run were surveyed for fish during fall 2007 as shown on Figure 2.4-3. Additional fish sampling in Walker Run occurred during spring and summer 2008. Benthic macroinvertebrate collections were completed in Unnamed Tributary ~~2~~5 during summer 2008. Unnamed Tributary ~~2~~5 was too overgrown to sample for fish, although no fish were observed during visual inspection. All six ponds were surveyed for fish during summer 2008. Fish were sampled using several gear types depending upon access and pond depth including seine, electrofishing boat, and towed electrofishing pram. Three stations were surveyed for fish in Walker Run within the BBNPP OCA boundary during 2007. These three plus two stations downstream of the BBNPP site were sampled during 2008. For summer 2008, all five previously mentioned Walker Run stations and an additional upstream station were surveyed. A towed electrofishing pram was used to collect fish in Walker Run.

Benthic macroinvertebrates were collected from two stations in Walker Run within the BBNPP site during fall 2007 and from four stations in Walker Run both within and downstream of the BBNPP site boundary during Spring 2008 as shown on Figure 2.4-3. During summer 2008, benthic macroinvertebrates were collected from five stations on Walker Run. A D-frame dip net was utilized for the collections.

2.4.2.1.4 Unnamed Tributary ~~2~~5

A total of 8,161 organisms and 16 taxa was collected from Unnamed Tributary ~~2~~5 (Table 2.4-30). The macroinvertebrate community was dominated by the amphipod Gammarus which comprised 95.9% of all organisms. A single EPT taxon, the mayfly Baetis, was collected which comprised 0.3% of the collection.

2.4.2.1.7 Habitat Importance

The on-site streams (Walker Run, Unnamed Tributary ~~2~~5), North Branch Canal, and ponds are typical habitats found throughout eastern Pennsylvania. None of these waterbodies are of

regional significance in terms of either unique habitat or utilization by a rare species, although headwaters are important components of stream ecosystems and locally the waters appear to support important ecological functions. Much of the recent scientific literature promotes the protection of headwaters streams and the role they play in determining downstream water quality (Lowe, 2005). Both Walker Run and Unnamed Tributary ~~2~~5 are important in this respect.

2.4.2.3 Offsite Unnamed Tributaries

Two unnamed tributaries were scheduled for benthic macroinvertebrate and fish surveys. The locations of Unnamed Tributary ~~1~~4 and Unnamed Tributary 3 are provided in Figure 2.4-3. Both tributaries flow directly into the Susquehanna River. These tributaries were selected for monitoring because their watersheds are adjacent to or within the BBNPP OCA boundary. No direct impact from construction or other on-site activities will occur within the streams. However, it is possible that runoff from the BBNPP site could affect these streams, as such, these waters were evaluated during the summer of 2008.

Unnamed Tributary ~~1~~4 was completely dry at the intended time of sampling and was not sampled. It is a small intermittent stream that flows through a forested patch of land near the assessment location. Stream channel width ranged to 5 ft (1.5 m). Unnamed Tributary 3 had limited flow during sampling. This section of stream flowed through a narrow forested patch of land and stream width ranged to 5 ft (1.5 m). The stream was mostly fed by a small impoundment along Confers Lane. Upstream of this point the stream channel was dry.

Final Safety Analysis Report

2.4.1.2 Hydrosphere

2.4.1.2.1 Hydrological Characteristics

An east-west trending ridge runs along the north side of the BBNPP site. The ground surface is highest in elevation along the ridge top (800 ft (244 m) msl); surface elevation decreases toward the NBSR, to the east and south. Surface drainage from the ridge, the BBNPP and SSES sites, and from adjacent farmlands, drain via small creeks southward and eastward toward the NBSR. These creeks include two named creeks (Walker Run and Salem Creek) and several small unnamed creeks. In addition, four small ponds are located on or directly adjacent to the BBNPP site (Figure 2.4-~~17~~3).

From the ridge top to the Susquehanna River, the creeks drop considerably in elevation (approximately 800 ft to 517 ft (244 m to 158 m) msl). Table 2.4-1 shows the approximate lengths and approximate gradients of stream extent located near the BBNNP Site.

2.4.1.2.1.3 Walker Run & Unnamed Tributary No. 1

Walker Run flows towards the south until it converges with the NBSR, at approximately River Mile 164 (264 km). Walker Run collects runoff from the area surrounding the BBNNP site and areas north, west, and southwest of the BBNPP site. The drainage area for the Walker Run watershed is approximately 4.10 mi^2 (10.60 km^2) (Figure 2.4-3). Walker Run has a difference in elevation of approximately 450 ft (137 m) over its entire length with an overall slope of 1.95% (Table 2.4-1).

Unnamed Tributary No. 1 (also known as the East Fork of Walker Run) flows along the eastern and southern site boundaries of BBNPP and discharges into Walker Run on the southwest side of the site. The Unnamed Tributary No. 1 encompasses a drainage area of about 0.68 mi2 (1.76 km2) and an approximate length of 2 mi (3.2 km) with an overall slope of 3.06% (Table 2.4-1).

2.4.1.2.1.4 Unnamed Tributary ~~No.2~~ No. 2

A second unnamed tributary flows southeastward within the BBNPP site and empties into ~~the Walker Ru~~Unnamed Tributary No. 1~~n~~. Its drainage area is part of the Walker Run watershed (see Section 2.4.3).

4.2.1.1 Description of Surface Water Bodies and Groundwater Aquifers

The BBNPP site covers an area of 424 ac (172 ha) within the 882 ac (357 ha) OCA and is located on a flat upland terrace adjacent to the Susquehanna Steam Electric Station in Salem Township, Luzerne County, Pennsylvania near U.S. Highway 11 as shown in Figure 2.1-2. Additional details on the BBNPP site location and surrounding area are provided in Section 2.1.

The topography at the BBNPP site is gently rolling with steeper slopes in the northern half of the site. Local relief ranges from approximately 485 ft (148 m) above mean sea level at the Susquehanna River to an elevation of 650 ft (198 m) along Walker Run in the southwest corner of the site up to approximately 800 ft (244 m) on the hilltop just north of the power block. The BBNPP site is drained by Walker Run toward the southwest, while the pipeline corridor to the east of the power block drains eastward toward the North Branch Canal and Susquehanna River. Five existing surface water impoundments are present on the site.

Surface Water Bodies

The surface water bodies (Figure 2.3-3~~3~~) within the hydrologic system that may be affected by the construction and operation of BBNPP are:

- East fork of Walker Run (labeled as Unnamed Tributary No. 1);
- Main stem of Walker Run (labeled as Walker Run);
- Johnson's Pond;
- Beaver Pond;
- West Building Pond;
- Unnamed Pond;
- Farm Pond;
- North Branch Division of the Pennsylvania Canal System (not shown in Figure 2.3-3); and
- Susquehanna River. Walker Run is perennial and typically fed by springs and seeps.

Four of the small onsite ponds are present on the eastern half of the BBNPP site while Farm Pond is in the vicinity of the power block. These man-made impoundments drain to the East

Fork of Walker Run (Unnamed Tributary No. 1) and Walker Run. Water levels in Walker Run appear to be heavily influenced by surface runoff from the site and from upstream drainages to the north and northwest of the site.

Figure 2.3-3 Walker Run Watershed

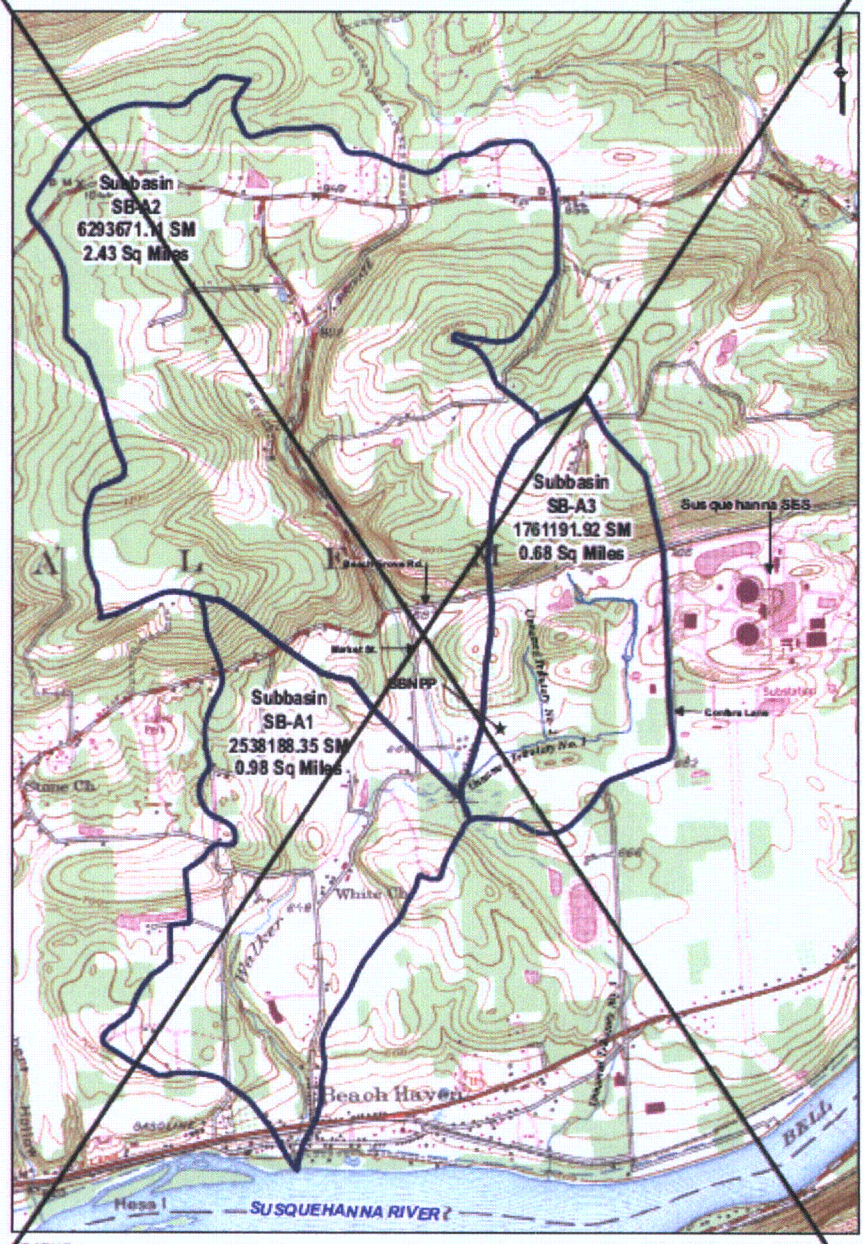
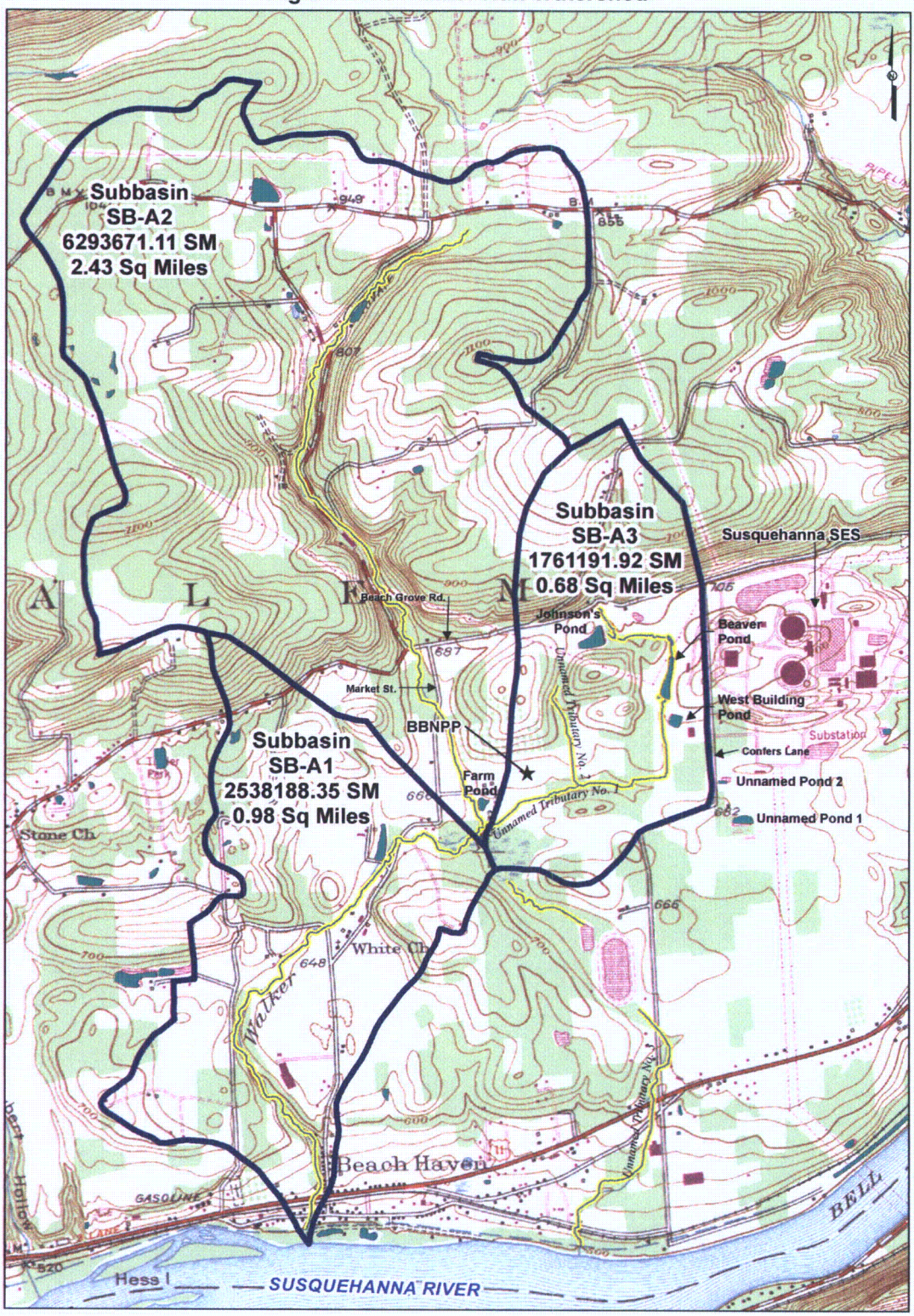


Figure 2.3-3 Walker Run Watershed



LEGEND

- ★ Center Point of Poposed Bell Bend NPP (BBNPP)
- Subbasin Boundary
- Lake/Pond
- Perennial Streams

0 750 1,500 3,000 Feet

0 250 500 Meters

REFERENCE:

- USGS 7.5-minute Qaudrangles. Berwick and Sybertsville, 1955, Photorevised 1989.
- National Hydrography Dataset (NHD): Waterbody Features, 2005.

Figure 2.4-3 Location of the Onsite Ponds and Aquatic Biota Collection Stations in Walker Run

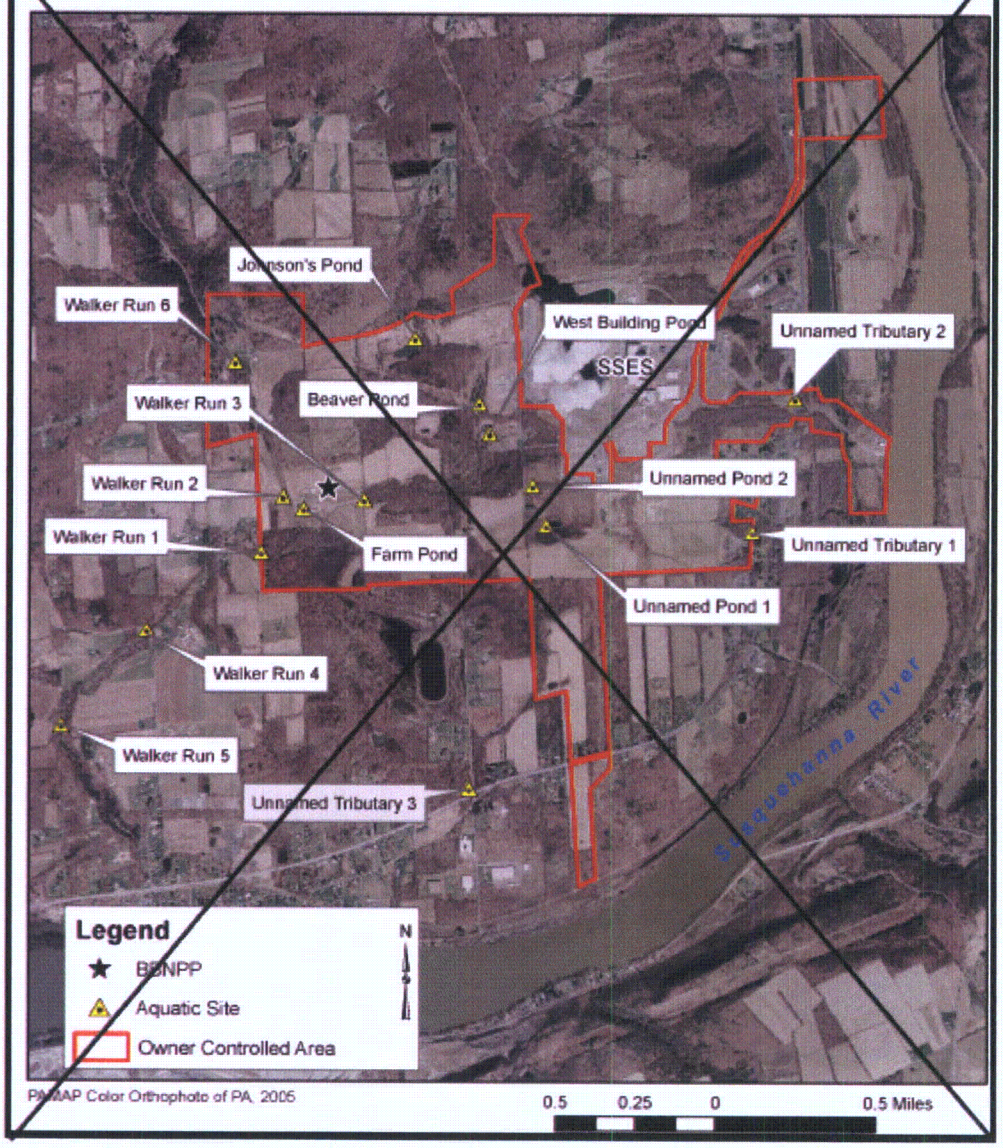
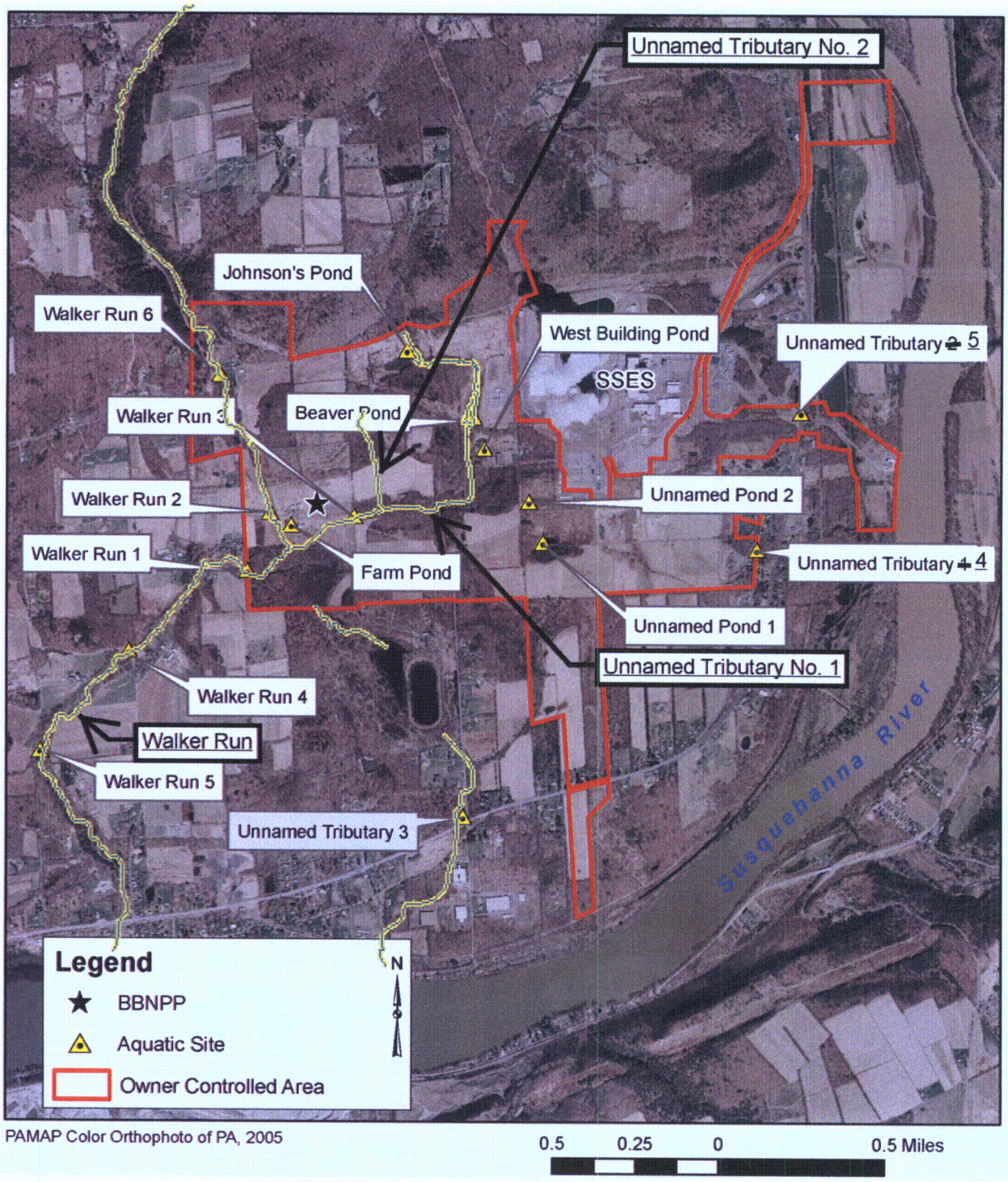


Figure 2.4-3 Location of the Onsite Ponds and Aquatic Biota Collection Stations in Walker Run



PAMAP Color Orthophoto of PA, 2005

0.5 0.25 0 0.5 Miles

AE 4.3-3

ESRP 4.3.2

Summary: *Provide more detailed information about the construction of the intake system, specifically:*

- *whether bedrock excavation is necessary;*
- *should bedrock excavation be necessary, discuss the potential use of blasting, precisely where the excavation would occur, and the potential impacts associated with that process;*
- *the amount of material that would be excavated, the depth to which the river bottom within the cofferdam would be excavated, the site location on which the material would be disposed, the risk of introducing contaminants into the environment because of the excavation, and the area, in square feet, of impacts to Waters of the U.S. as a result of the cofferdam installation;*
- *the area of the Susquehanna River that would be impacted versus the land area impacted;*
- *any effects on the Riverlands Preserve by construction of the intake.*

Full Text: First Bullet: ER Rev 1, Page 4-45 has text that reads "Intake construction will require excavation into the bedrock below streambed elevation" and text on page 4-45 reads "Blasting should not be necessary since both the intake and discharge structures will be constructed in locations which only the river bed overburden, not the bedrock, will need to be penetrated".

Third Bullet: ER Rev 1 page 4-12 states that material would be moved to a spoils area outside designated wetlands. Please identify the location.

Fourth Bullet: ER Rev 1 p. 29 states that 0.7 ac in the Susquehanna River would be disturbed. This seems to conflict with Table 4.1-1 that lists the total area impacted as 0.7 ac, including forest and wetlands; and the calculations of disturbed area in Section 4.3.2.2 (ER Rev 1, p. 4-45). Please clarify.

Fifth Bullet: ER Rev 1, p. 4-31 states "The 1,200 ac (486 ha) Susquehanna Riverlands Environmental Preserve was also identified as an important habitat as this area encompasses a wide variety of upland and wetlands habitats along both sides of the Susquehanna River, and includes a 400 ac (162 ha) public recreation area. Site development within this area will consist of surface water intake and blowdown related facilities." Please describe the construction impacts on the Susquehanna Riverlands Environmental Preserve.

Response:

First Bullet

Bedrock excavation should not be necessary within the river limits. Based on available subsurface information, the existing ground level is at approximately Elevation 505 ft (153.9 m) at the intake structure location and the river bottom is at approximately Elevation 474 ft (144.5 m) Bedrock is present along the river's edge at approximately Elevation 462 ft

(140.8 m) and slopes upward away from the river (Reference SSES FSAR Figure 2.4-42). Bedrock at the east edge of the intake structure (west of the river edge) is at about Elevation 470 ft (143.3 m) and slopes upward to approximately El. 480 ft (146.3 m) at the west end of the intake structure. The rock elevation decreases eastward into the river. The top of the concrete mat for the intake structure is at elevation 474 ft (144.5 m). Considering a 2 ft (0.6m) thick concrete mat, the bottom of the excavation is at Elevation 472 ft (143.9 m). Therefore, no rock excavation is anticipated beneath the forebay area within the river limits; however, some rock excavation is required for the intake structure itself on land adjacent to the river.

The discharge pipe will be slightly below the river bottom and the diffuser is situated at the bottom of the river as shown in Figure 3.4-6. Since the pipe elevation is above the elevation of the rock, no rock excavation will be necessary for the discharge pipeline and diffuser within the river limits.

Second Bullet

The bedrock present at the intake structure is a black siltstone (Reference SSES FSAR Figure 2.4-48). The expected maximum thickness of the rock excavation is approximately 10 ft (3.1 m) for the land side portion of the intake structure. No Rock Quality Designation (RQD) values are provided; however it is anticipated that no rock blasting is required. If the rock cannot be removed using backhoes or other conventional equipment, then rippers or hydraulic rams could be used to break up the rock before removal. Blasting could loosen the rock resulting in some additional leakage beneath the sheet pile cutoff wall during construction, which could be difficult to control.

If blasting is to be performed, it will likely be performed near the west end of the intake structure, which is the farthest area away from the Susquehanna River.

Third Bullet

Considering the excavation for the intake structure to be approximately 100 ft (30.5 m) by 100 ft (30.5 m) (10,000 ft^2) (929 m^2) with a bottom elevation at 472 ft (143.9 m) and a top elevation at the existing grade at El. 505 ft (153.9 m), the total excavation quantity is approximately 12,500 yd^3 (9,556.9 m^3). Considering an average thickness of 5 ft (1.5 m) for the rock over the area of 100 ft (30.5 m) by 100 ft (30.5 m) (for the intake structure), the total rock excavation is approximately 1,900 yds^3 (1,452.7 m^3) (included in the 12,500 yds^3 (9,556.9 m^3)). This area is not within the river limits.

Considering the excavation for the forebay area in the river to be 100 ft (30.5 m) by 200 ft (61 m) (20,000 ft^2 (1,858.1 m^2)) and an average depth of 8 ft (2.4 m) (averaged from 490 ft (149.4 m) to 474 ft (144.5 m)), the total amount of excavated matter from the forebay area is approximately 6,000 yds^3 (4,587.3 m^3). Thus the total excavation is 18,500 yd^3 (14,431 m^3) (12,500 yd^3 (9,556.9 m^3) + 6,000 yds^3 (4,587.3 m^3)). The total area to be disturbed for the construction of the intake structure and the forebay is approximately 30,000 ft^2 (2,787.1 m^2). After construction, some additional area will be disturbed during the removal of the cofferdams in the forebay area. This area is approximately 6,400 ft^2 (594.6 m^2).

The excavation for the installation of the discharge pipe and diffuser encompasses an area of approximately 377.5 ft (115.1 m) by 50 ft (15.2 m) wide in the Susquehanna River. This is an area of approximately 18,875 ft^2 (1,753.5 m^2). The discharge pipeline is supported within the river bottom sand and gravel. The concrete anchor pad for the diffuser is founded on top of the underlying bedrock as shown on Figure 3.4-6. Considering an average depth of excavation of

8 ft (2.4 m) within the river bottom soil, the amount of soil removed from the discharge pipe excavation is approximately 5,600 yds^3 (4,300 m^3).

The dredged material will be placed in a dredge pond as shown on Figure 3.4-3. Some of the material excavated from the intake structure and discharge pipeline could be used to construct the fill around the intake structure (if suitable) to raise the grade up to the final grade elevation at Elevation 525.5 ft (160.17 m). The remainder of the material could be left in place in the dredge pond, used for other construction work if the material is suitable for fill, or removed from the pond and disposed of with the other plant excavated materials. For additional information concerning disposal of excess excavated materials please see responses to RAIs STO 2.3-1, TE 4.3-9, and USACE-2g, submitted to the NRC on September 25, 2009, in letter BNP-2009-282.

Utilizing the cofferdam approach to maintain excavation in dry conditions for the intake structure and the discharge pipeline minimizes the risk for introducing any contaminants into the river environment during construction. All work is contained within the limits of the cofferdams and sheet piling.

Fourth Bullet

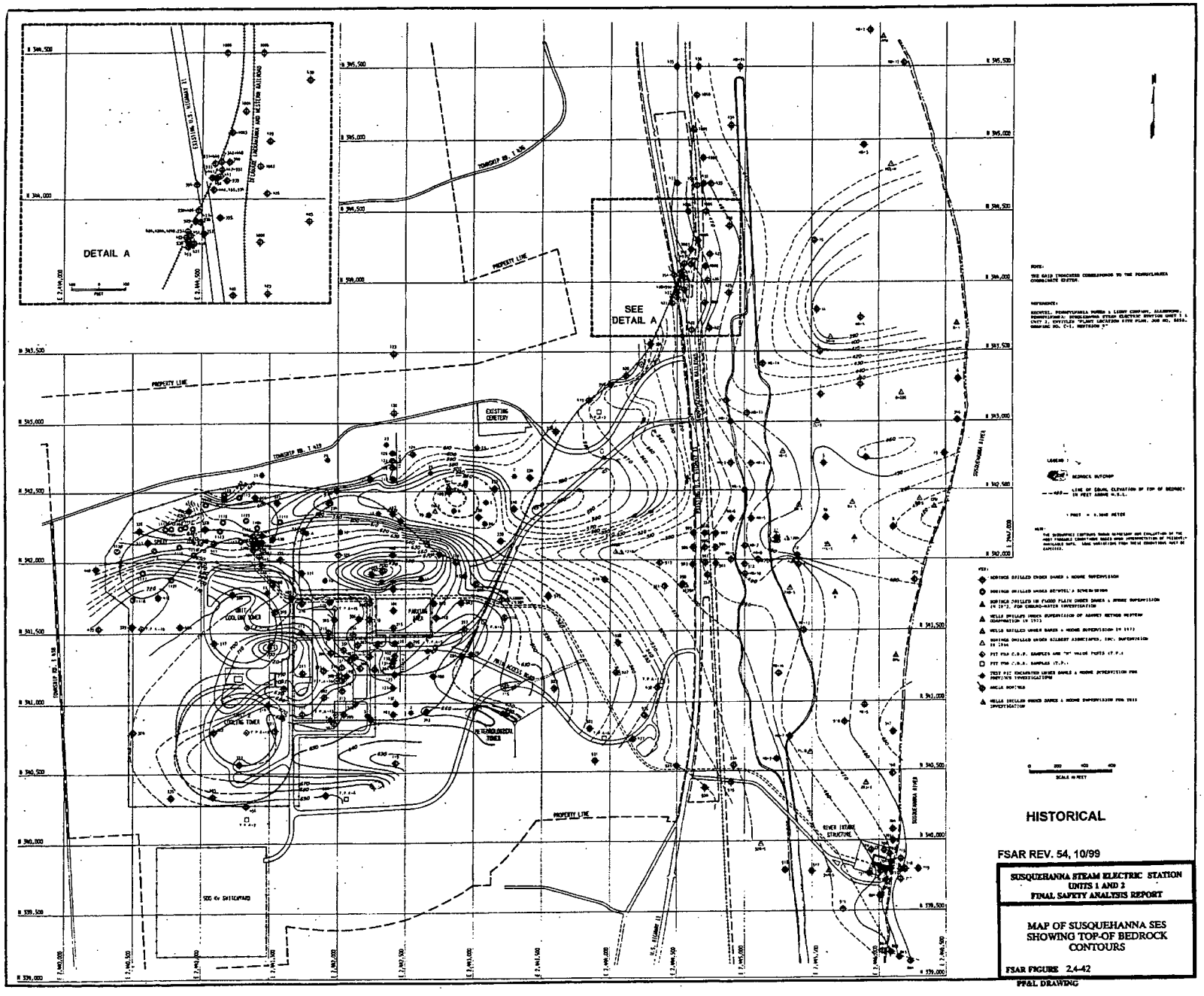
The total area within the limits of the river that will be disturbed during construction is approximately 45,275 ft^2 (4,206.2 m^2), (26,400 ft^2 [2,452.6 m^2] for the forebay area and 18,875 ft^2 [1,753 m^2] for the discharge pipeline and diffuser). This is equivalent to 1.04 ac (0.42 ha).

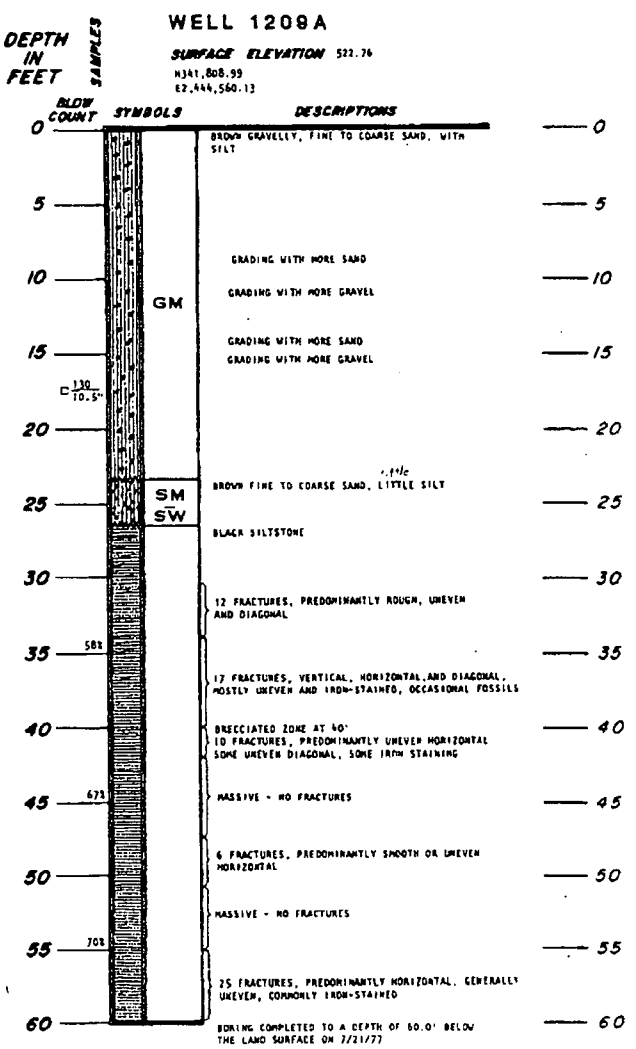
The land area to be disturbed for the intake structure is 10,000 ft^2 (919 m^2), or 0.23 ac (0.09 ha).

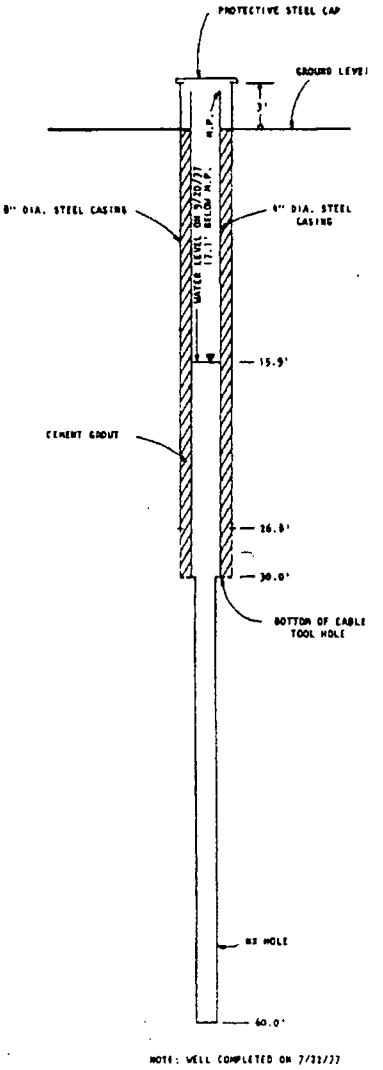
The total area disturbed for the construction of the intake structure and the discharge pipeline in the river is 1.27 ac (1.3 ac = 0.5 ha).

Fifth Bullet

Construction impacts within the Susquehanna Riverlands Environmental Preserve (SREP) are minor and consist of the construction of: the intake and discharge structures; construction dewatering facilities; roadway; water supply, blowdown, de-icing lines, and electrical ducts; and a rerouted drainage ditch to accommodate the new intake structure. Construction impacts associated with the Intake structure are described in Sections 4.2.1.2, 4.2.2.10, 4.3.1.1 (Important Habitats), 4.3.2.1, and 4.3.2.2 of the ER. Construction of the intake structure will permanently impact approximately 1.3 acres (0.53 ha) of forested and emergent wetland, and permanently impact approximately 0.05 acres (0.02 ha) of the ditch that drains the North Branch Canal. Water, blowdown, and de-icing lines, and electrical ducts will be constructed in existing maintained corridors, thus impacts will be minimal for construction of these components, although a portion of the existing North Branch Canal will need to be dewatered to facilitate the construction of the pipeline corridor. Installation of dewatering facilities associated with the intake and discharge construction along with roadway construction may result in additional temporary and permanent disturbances to old field habitat.


DETAIL A
SEE DETAIL A
PROPERTY LINE
EXISTING CEMETERY
TOWNSHIP RD. T 439
TOWNSHIP RD. T 438
SUSQUEHANNA RIVER
RIVER INTAKE STRUCTURE
500 kv SWITCHYARD
HISTORICAL
FSAR REV. 54, 10/99
SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
FINAL SAFETY ANALYSIS REPORT
MAP OF SUSQUEHANNA SES
SHOWING TOP-OF BEDROCK
CONTOURS
FSAR FIGURE 2.4-42
PP&L DRAWING





LOG OF WELL 1209A

CONSTRUCTION DETAILS OF WELL 1209A

FSAR REV. 54, 10/99

HISTORICAL

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
FINAL SAFETY ANALYSIS REPORT

LOG OF BORING AND OBSERVATION WELL CONSTRUCTION DETAILS - 1209A

FSAR FIGURE 2.4-48

PP&L DRAWING

COLA Impact:
The BBNPP COLA ER will be revised as follows in a future COLA revision:

4.2.1.2 Construction Activities

Intake/Pumphouse Cofferdams

A sheet pile cofferdam and dewatering system will be installed downstream of the Susquehanna Steam Electric Station (SSES) Units 1 and 2 intake structure to facilitate the construction of the BBNPP Circulating Water System (CWS) Makeup Water Intake Structure. Pilings will also be driven to facilitate construction of new discharge system piping.

Excavation of the intake structure, erection of the pump house, and installation of mechanical, piping, and electrical systems follow the piling operations and continue through plant construction. Excavated material will be transported to a spoils area located outside the boundaries of designated wetlands as shown in Figure 3.4-3.

4.3.1 Terrestrial Ecosystems

...

Additionally, construction of the surface water CWS Makeup Water Intake Structure and blowdown diffuser structure will involve very minor impacts of ~~0.7~~ 1.0 acres (~~0.3~~ 0.4 hectares) within the Susquehanna River as shown in Figure 2.2-1. An additional 0.2 acres (0.08 ha) will be impacted for the construction of the intake structure on land. Wherever possible, the construction footprint has been designed to minimize impacts to the river channel and terrestrial ecosystems, specifically potential habitat for species of special concern; wetlands; and forest cover, especially large blocks of contiguous forest that provide habitat for forest interior dwelling species.

4.3.2.2 Impacts to the Susquehanna River and Offsite Streams

...

Turbidity and sedimentation in the river will be minimized during construction of the intake structure by placement of a cofferdam around the work area. ~~Intake construction will require excavation into the bedrock below streambed elevation.~~ Bedrock excavation should not be necessary within the river limits. Bedrock at the east edge of the intake structure is at about Elevation 470' and slopes upward to approximately El. 480' at the west end of the intake structure. The rock elevation decreases eastward into the river. The top of the concrete mat for the intake structure is at elevation 474'. Considering a 2' thick concrete mat, the bottom of the excavation is at Elevation 472'. Therefore, no rock excavation is required beneath the forebay area within the river limits; however, some rock excavation is required for the intake structure itself on land adjacent to the river. A seepage cutoff structure will be built to allow the construction of the intake structure to occur in dry conditions. The cutoff wall will consist of a circular cofferdam consisting of interlocking sheetpile sections. The cofferdam will be anchored into the bedrock to minimize any under seepage into the excavation and to provide stability against sliding. The diameter of the cofferdams will be designed to provide adequate stability from overturning due to the water load from the river.

The area of the river disturbed by the installation of the cofferdam will be approximately 200 ft (61 m) into the river channel, by 100 ft (30 m) parallel to the shoreline, for a total area of 20,000 ft^2 (1,858 m^2). When the cofferdam is removed some additional area will be disturbed.

This total area after construction will be approximately 120 ft (37 m) into the river channel, by 220 ft (67 m) for a total disturbed area of 26,400 ft^2 (2,453 m^2).

After completion of the intake structure, the cofferdams and fill material will be removed to allow the river to flow into the structure. After removal of the cofferdams a temporary increase in sediment in the water column is expected. The cofferdams will not inhibit aquatic organism movement within the river due to the small area affected by construction activity (see Figure 3.4 11).

A similar process will be employed during diffuser pipe installation. The diffuser begins 203 ft (62 m) perpendicularly from the shoreline, and extends 119.5 ft (36 m) into the river channel. The axial distance along the discharge pipeline to the diffuser is approximately 210 ft (64 m). Thus the trench for the pipeline and the diffuser will extend approximately 329.5 ft (100 m), i.e., 210 ft (64 m) plus (+) 119.5 ft (36 m), into the river, and will be approximately 50 ft (15 m) wide. The discharge pipe is slightly below the river bottom and the diffuser is situated at the bottom of the river as shown in Figures 3.4-6 and 3.4-12. Since the pipe elevation is above the elevation of the rock, no rock excavation will be necessary for the discharge pipeline and diffuser within the river limits. The total disturbed area during construction will be approximately 16,500 ft^2 (1,533 m^2). After installation of the pipe and the riprap protection, the final disturbed area will be slightly narrower, with a disturbed area of approximately 329.5 ft (100 m) by 20 ft (6 m) for a total of 6,600 ft^2 (613 m^2). Construction will result in removal and disruption of river substrate in the immediate vicinity of the diffuser pipe. Temporary increases in suspended sediments in the water column will result during cofferdam installation. After removal of the cofferdams a temporary increase in sediment in the water column is also expected. The cofferdams will not inhibit migration of aquatic organisms within the river due to the small area affected by construction activity.

Table 4.1-1 Construction Areas Acreage and Operations Area Acreage, Land Use and Zoning

Construction Area	Construction Acreage (hectares)	Current Land Use	Current Zoning
BBNPP Power Block	61.2 (24.8)	B, F, A, U/B, W, WL	AD, CD
ESWEMS Retention (UHS) Pond and Pumphouse	9.9 (4.0)	F, A	AD
Intake Structure and Discharge Pipeline/Diffuser (Land and River)	~~0.7 (0.3)~~ 1.3 (0.5)	F, W, WL	CD
BBNPP Switchyard	7.5 (3.0)	F, A, WL	AD, CD
SSES Units 1 and 2 Switchyard (expansion)	11.0 (4.5)	B, F, A, U/B, W, WL	AD, HI
Cooling Towers Area	21.1 (8.5)	F, A	AD
Water Treatment	9.2 (3.7)	B, F, A	AD
Roads	16.9 (6.8)	B, F, A, U/B, WL	AD, CD, HB
Rail Roads	28.3 (11.4)	B, F, A, U/B, WL	AD, HI
Storm Water Ponds	29.7 (12.0)	F, A, U/B	AD, HI
Permanent Laydown Areas	76.3 (30.9)	F, A	AD, CD
Permanent Offices	0.9 (0.4)	F	AD
Permanent Parking	23.6 (9.6)	F, A	AD, CD
Onsite Transmission Line R/W	68.6 (27.8)	B, F, A, U/B, WL	AD, CD, HI
Total Acreage of Disturbed Area for Permanent Construction Features	**364.9 (147.7)**	--	--
Batch Plant	25.5 (10.3)	B, F, A	AD
Temporary Laydown Areas	119.9 (48.5)	B, F, A, U/B	AD, CD, HI
Temporary Offices	5.6 (2.3)	B, F, A	AD, HB, HI
Temporary Parking	90.0 (36.4)	B, F, A, U/B	AD, HB, HI
Onsite Transmission Line R/W	25.1 (10.2)	B, F, A	AD, CD, HI
Total Acreage of Disturbed Area for Temporary Construction Features	**265.4 (107.4)**	--	--

Notes:

Land Use categories
B = Barren
F = Forest
A = Agricultural
U/B = Urban or Built Up
W = Water
WL = Wetlands

Zoning categories
AD = Agricultural District
CD = Conservation District
HI = Heavy Industrial
HB = Highway Business

Figure 3.4-6 View of Discharge Outfall for Discharge System for BBNPP

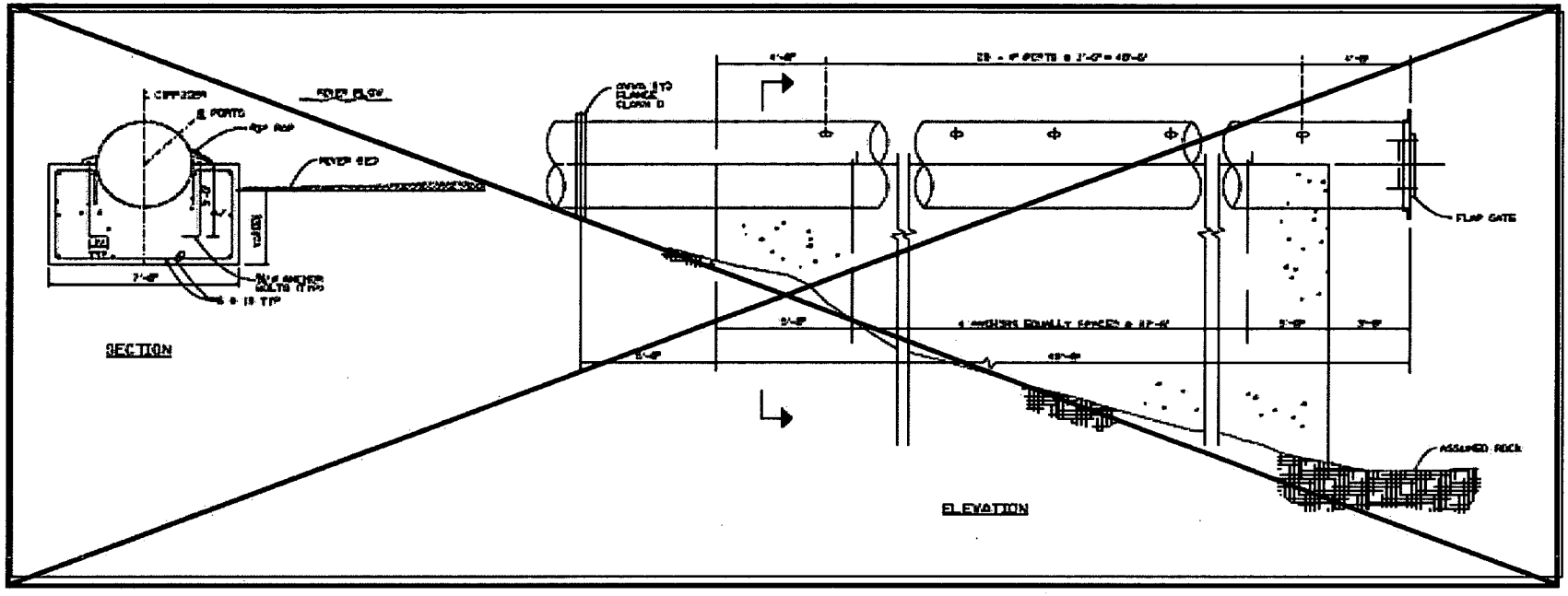


Figure 3.4-6 View of Discharge Outfall for Discharge System for BBNPP

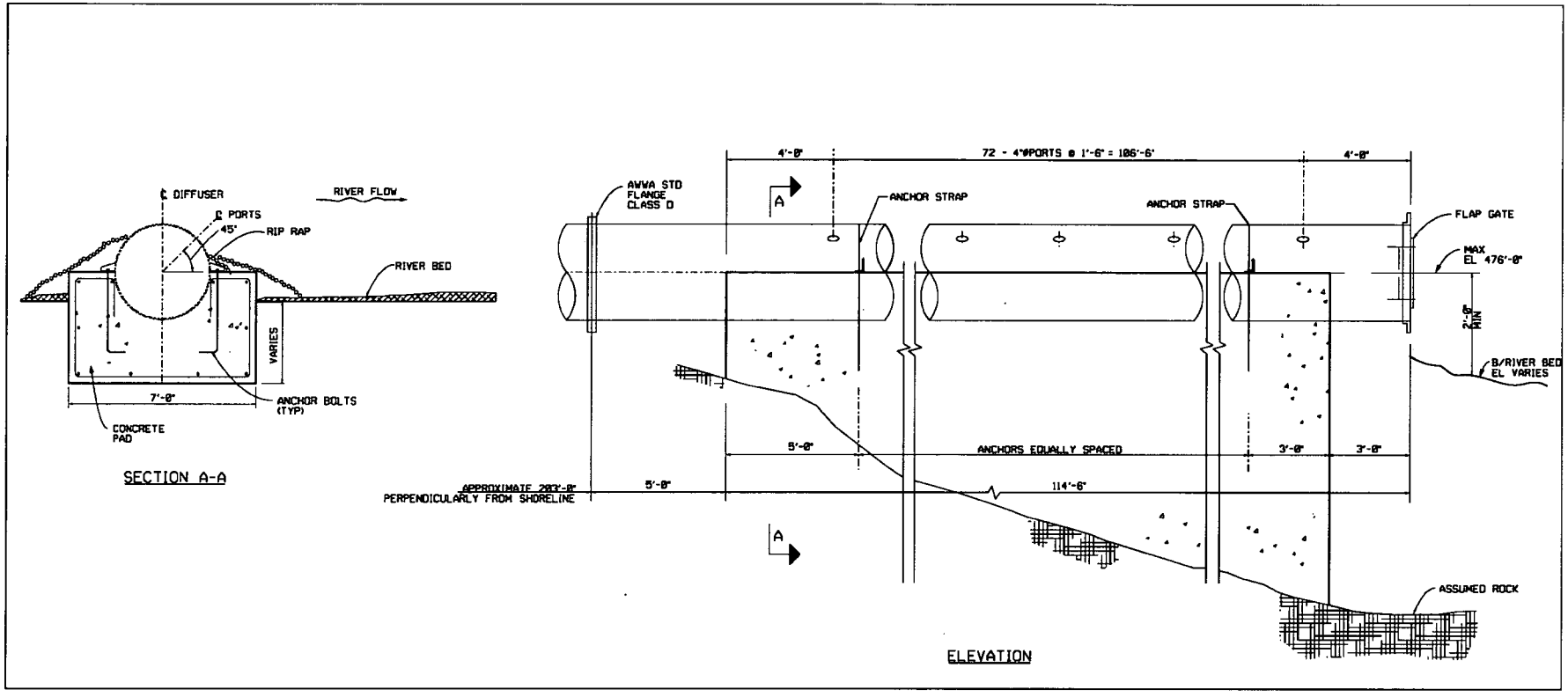
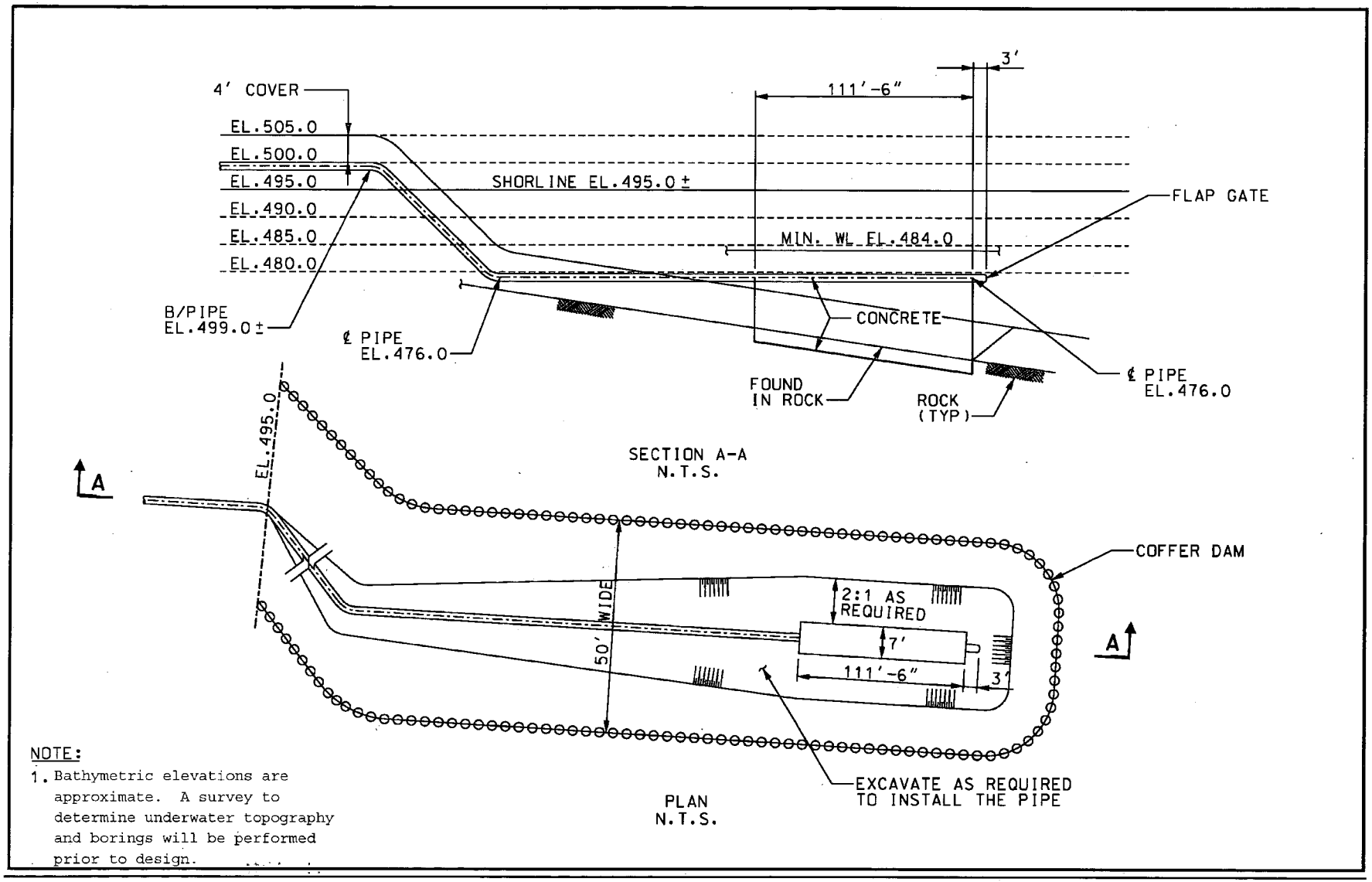


Figure 3.4-12 End of Blowdown Line



NOTE:

1. Bathymetric elevations are approximate. A survey to determine underwater topography and borings will be performed prior to design.

STO 1-1

Summary: Provide all ER references (electronic format if available).

Full Text: Received AREVA publicly available documents. Still need non-AREVA sections (2.3.1, 2.3.2, 2.3.3, 2.6)

Response: References for ER Sections 2.3.1 (Water), 2.3.2 (Water Use), 2.3.3 (Water Quality), and 2.6 (Geology) are available in Enclosure 4. The references provided in Enclosure 4 were formatted as per USNRC "Guidance for Electronic Submissions to the NRC," June 25, 2009 Revision 5.

2.3.1.3 References

Crawford, 1999. Part III, Structural Geology and Tectonics, Chapter 16: Piedmont Upland, in C.H. Shultz ed., The Geology of Pennsylvania: Pennsylvania Bureau of Topographic and Geologic Survey Special Publication 1, p 234-241, M.L. Crawford, W.A. Crawford, A.L. Hoersch, and M.E. Wagner, 1999.

Crowl, 1980. Glacial Border Deposits of Late Wisconsinan Age in Northeastern Pennsylvania. Pennsylvania Bureau of Topographic and Geologic Survey, General Geology Report 71, G.H. Crowl and W.D. Sevon, 1980.

DCNR, 2007a. Geologic Map of Pennsylvania, Pennsylvania Department of Conservation and Natural Resources, Website: http://www.dcnr.state.pa.us/topogeo/maps/map7.pdf, Date accessed: December 14, 2007.

DCNR, 2007b. Piedmont Lowland Section Piedmont Province, Pennsylvania Department of Conservation and Natural Resources, Website: http://www.dcnr.state.pa.us/topogeo/map13/13pls.aspx, Date accessed: December 14, 2007.

DCNR, 2007c. Gettysburg-Newark Lowland Section Piedmont Province, Pennsylvania Department of Conservation and Natural Resources, Website: http://www.dcnr.state.pa.us/topogeo/map13/13gnls.aspx, Date accessed: December 14, 2007.

DCNR, 2007d. Piedmont Upland Section Piedmont Province, Pennsylvania Department of Conservation and Natural Resources, Website: http://www.dcnr.state.pa.us/topogeo/map13/13pus.aspx, Date accessed: December 14, 2007.

DCNR, 2008. The Resource- News & Information, November 2001. Website: http://www.dcnr.state.pa.us/polycomm/res2001/bowerdam1101.htm, Date accessed: June 17, 2008.

Ecology III, 1986. Pre-Operational Studies of the Susquehanna River in the Vicinity of the Susquehanna Steam Electric Station, 1971-1982, Ecology III, Inc, December 1986.

FEMA, 2008. Flood Insurance Map, Luzerne County. Website: http://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1, Date accessed: March 27, 2008.

Hollowell, 1971. Hydrology of the Pleistocene Sediments in the Wyoming Valley, Luzerne County, PA, Pennsylvania Bureau of Topographic and Geologic Survey, Water Resource Report 28, J.R. Hollowell, 1971.

Inners, 1978. Geology and Mineral Resources of the Berwick Quadrangle, Luzerne and Columbia Counties, PA, Pennsylvania Bureau of Topographic and Geologic Survey, Atlas 174c, J.D. Inners, 1978.

Lohman, 1937. Ground Water in Northeastern Pennsylvania, Pennsylvania Geological Survey, 4th Series, Bulletin W4, S.W. Lohman, 1937.

NOAA, 2008. Middle Atlantic River Forecast Center, Hurricane Agnes, Website: http:// ahps.erh.noaa.gov/marfc/Flood/agnes.html, Date accessed: February 7, 2008.

PADEP, 2008. Pennsylvania's Major River Basins, Website: http://www.dep.state.pa.us/river/ basininfo.htm, Date accessed: June 19, 2008

PPL, 1999a. SSES Unit 1 and 2 FSAR Report, Revision 54, Table 2.4-1, PPL Susquehanna, LLC, October 1999.

PPL, 1999b. SSES Unit 1 and 2 FSAR Report, FSAR Revision 62, FSAR 2.4 Hydrologic Engineering, PPL Susquehanna, LLC, 1999.

PPL, 1999c. SSES Unit 1 and 2 FSAR Report, Revision 54, Table 2.4-33 and 2.4-34, PPL Susquehanna, LLC, October 1999.

Root, 1999. Part III, Structural Geology and Tectonics, Chapter 21: Gettysburg-Newark Lowland, in C.H. Shultz ed, The Geology of Pennsylvania: Pennsylvania Bureau of Topographic and Geologic Survey Special Publication 1, p 298-305, S. Root and D. MacLachlan, 1999.

Sevon, 2000. Regolith in the Piedmont Upland section, Piedmont Province, York, Lancaster, and Chester Counties, Southeastern Pennsylvania, Southeastern Geology, Volume 39, Number 3 and 4, p 223-241, W. Sevon, October 2000.

SRBC, 2008a. Middle Susquehanna Sub-basin, Sub-basin Information, Website: http:// www.srbc.net/subbasin/middlesus.htm, Date accessed: June 18, 2008.

SRBC, 2008b. Susquehanna River Basin, Information Sheet, Website: http://www.srbc.net/ pubinfo/docs/Susq%20River%20Basin%20General%20(11 _06).PDF, Date accessed: June 19, 2008.

Taylor, 1984. Groundwater Resources of the Upper Susquehanna River Basin, PA, Pennsylvania Bureau of Topographic and Geologic Survey, Water Resource Report 58, L.E. Taylor, 1984.

Trapp, 1997. Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, Virginia, West Virginia, Ground Water Atlas of the United States, U.S. Geological Survey, Hydrologic Investigations Atlas 730-L, H. Trapp and M. Horn.

USGS, 1989. 1:24,000 Topographic Maps: Berwick, Pennsylvania, U.S. Geological Survey, 1989.

USGS, 2002. Water Resources Data New York Water Year 2002, Volume 3, Western New York, U.S. Department of the Interior, U.S. Geological Survey, Website: http://ny.water.usgs.gov/pubs/ wdr/wdrny023/wdrny023.pdf, pp. 75 - 77.

USGS, 2008a. Peak Streamflow for Pennsylvania USGS 01540500 Susquehanna River at Danville, PA, Website: http://nwis.waterdata.usgs.gov/pa/nwis/peak?site_no=01540500&agency_cd=USGS&format=html, Date accessed: January 25, 2008.

USGS, 2008b. Peak Streamflow for Pennsylvania USGS 01536500 Susquehanna River at WilkesBarre, PA, Website: http://nwis.waterdata.usgs.gov/pa/nwis/peak?site_no=01536500&agency_cd=USGS&format=html, Date accessed: January 25, 2008.

USGS, 2008c. USGS 01534490 Aylesworth Creek Lake, PA, Website: http://waterdata.usgs.gov/pa/nwis/uv?site_no=01534490, Date accessed: April 4, 2008.

USGS, 2008d. USGS 01534180 Stillwater Lake, PA, Website: http://waterdata.usgs.gov/pa/nwis/uv/?site_no=01534180&PARAmeter_cd=00062, Date accessed: April, 4, 2008.

USGS, 2008e. USGS 01517900 Tioga Lake at Tioga Dam, PA, Website: http://waterdata.usgs.gov/pa/nwis/uv?site_no=01517900, Date accessed: April 4, 2008.

USGS, 2008f. USGS 01518498 Hammond Lake at Hammond Dam, PA, Website: http://waterdata.usgs.gov/pa/nwis/uv?site_no=01518498, Date accessed: April 4, 2008.

USGS, 2008g. USGS 01519995 Cowanesque Lake, PA, Website: http://waterdata.usgs.gov/pa/nwis/uv?site_no=01519995, Date accessed: April 4, 2008.

USGS, 2008h. USGS 01540500 Susquehanna River at Danville, Website: http://waterdata.usgs.gov/nwis/nwisman/?site_no=01540500&agency_cd=USGS, Date accessed: January 22, 2008

USGS, 2008i. USGS 01536500 Susquehanna River at Wilkes-Barre, PA, Website: http://waterdata.usgs.gov/nwis/nwisman/?site_no=01536500&agency_cd=USGS, Date accessed: January 22, 2008

USGS, 2008j. USGS Ground-Water Daily Data for the Nation Grouped by County, Website: http://nwis.waterdata.usgs.gov/nwis/dv?referred_module=gw&state_cd=42&format=station_list&sort_key=site_no&group_key=county_cd&sitefile_output_format=html_table&column_name=agency_cd&column_name=site_no&column_name=station_nm&range_selection=days&period=365&begin_date=&end_dat e=&d ate_format=YYYY-M M-DD&rdb_compression=file&list_of_search_criteria=state_cd%2Crealtime_parameter_selection, Date accessed: July 8, 2008.

Williams, 1987. Groundwater Resources of the Berwick-Bloomsburg-Danville Area, East- Central Pennsylvania, Pennsylvania Bureau of Topographic and Geologic Survey, Water Resource Report 61, J.H. Williams and D.A. Eckhardt, 1987.

2.3.2.3 References

CFR, 1998. 40 CFR Part 122, EPA Administered Permit Programs: The National Pollutant Discharge Elimination System. Website: http://www.epa.gov/npdes/regulations/122_26.txt, Date accessed: September 30, 2008.

CFR, 2007. Water Pollution Control Act, Title 33, Code of Federal Regulations, Part 1251.

COP, 2006. Specific Water Quality Criteria, 25 Pa. Code Section 93.7, Website: http://www.pacode.com/secure/data/025/chapter93/025_0093.pdf , Date accessed: April 30, 2008.

CWA, 1948. Federal Water Pollution Control Act, (33 U.S.C. 1251 - 1376.) Website: http://www.fws.gov/laws/lawdigest/FWATRPO.HTML, Date accessed: September 30, 2008.

DCNR, 2008a. Pennsylvania Groundwater Information System (PaGWIS) Documentation, Pennsylvania Department of Conservation and Natural Resources, Website: http://www.dcnr.pa.us/topogeo/groundwater/PaGWIS/help.aspx, Date accessed: May 5, 2008.

Federal Register, 2006a. Part III. Susquehanna River. Basin Commission. 18 CFR Parts 803, 804, 805 et al. December 29, 2006. Website: http://edocket.access.gpo.gov/2006/pdf/E6-21674.pdf , Date accessed: August 5, 2008.

Federal Register, 2006b. Part III. Susquehanna River. Basin Commission. 18 CFR Parts 803, 804, 805 et al. July , 2006. Website: http://edocket.access.gpo.gov/2006/06-5632.htm, Date accessed: August 5, 2008.

FEMA, 2008. Flood Insurance Rate Map, Luzerne County. Federal Emergency Management Agency, Website: http://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001 &catalogId=10001 &langId=-1, Date accessed: March 27, 2008.

Hallowell, 1971. Hydrology of the Pleistocene Sediments in the Wyoming Valley, Luzerne County, PA, Pennsylvania Bureau of Topographic and Geologic Survey, Water Resource Report 28, J.R. Hollowell, 1971.

Lohman, 1937. Ground Water in Northeastern Pennsylvania, Pennsylvania Geological Survey, 4th Series, Bulletin W4, S.W. Lohman, 1937.

PADEP, 2008a. Water Withdrawal and Use Registration, Pennsylvania Department of Environmental Protection, Website: http://www.dep.state.pa.us/dep/DEPUTATE/Watermgt/wc/Act220/Registration/Defaultnew.htmDate accessed: February 6, 2008.

PADEP, 2008b. State Water Planning, Population Projections 2000, Pennsylvania Department of Environmental Protection, Website: http://www.dep.state.pa.us/dep/deputate/watermgt/wc/Act220/2000population_projections.htm , Date accessed: March 7, 2008.

PADEP, 2008c. Mapping/GIS, Pennsylvania Department of Environmental Protection, Website: http://www.dep.state.pa.us/ , Date accessed: February 6, 2008.

PADEP, 2008d. Survey Information. Water Supply Data for Luzerne and Columbia Counties, Pennsylvania Department of Environmental Protection, Website: http:// www.drinkingwater.state.pa.us/dwrs/HTM/DEP_frm.html, Date accessed March 20, 2008.

PADEP, 2008e. Overview Water Resources Planning Act, Pennsylvania Department of Environmental Protection, Website: http://www.dep.state.pa.us/dep/deputate/watermgt/wc/ subjects/WaterResources/docs/WaterResourcesExecutiveSummary.htm , Date accessed: March 25, 2008.

PADEP, 2008g. Pennsylvania State Water Plan, A Vision for Pennsylvania's Future, Pennsylvania Department of Environmental Protection, March 21, 2008.

PPL, 1989. Site Well System (PWS ID 2400994). Pennsylvania Power & Light-Susquehanna, LLC, Pennsylvania Form ER-BCEC-47:11/84 on file with PADEP, Division of Water Supplies, 4 p.

PPL, 2006. Susquehanna Steam Electric Station Units 1 & 2, License Renewal Application, Pennsylvania Power & Light-Susquehanna, LLC.

PPL, 2007. Susquehanna Steam Electric Station Units 1 and 2, 2006 Annual Report, Annual Radiological Environmental Report, Pennsylvania Power & Light-Susquehanna, LLC.

SRBC, 2002. Guidelines for Using and Determining Passby Flows and Conservation Releases for Surface Water and Groundwater Withdrawal Approvals. Susquehanna River Basin Commission, November 8. Website: http://www.srbc.net/policies/docs/Policy%202003_01.pdf, Date accessed: May 5, 2008.

SRBC, 2005. Groundwater Management Plan for the Susquehanna River Basin. Susquehanna River Basin Commission, Publication No. 236.

SRBC, 2007. Pennsylvania Agricultural Consumptive Water Use. January, 2007. Susquehanna River Basin Commission, Website: http://www.srbc.net/pubinfo/docs/ Agricultural%20Water%20Use%20(1 _07).PDF, Date accessed: May 5, 2008.

SRBC, 2008. Middle Susquehanna Subbasin, Susquehanna River Basin Commission, Website: httt://www.srbc.net/subbasin/middlsus.htm, Date accessed: February 19, 2008.

USEPA, 2007a. U.S. EPA Region 3 Water Protection Division Sole Source Aquifer Program, U.S. Environmental Protection Agency, Website: http://www.epa.gov/reg3wapd/presentations/ssa/ index.htm, Date accessed: January 9, 2007.

USEPA, 2008a. PPL Susquehanna, LLC; SSES, Units 1 & 2; Draft Environmental Assessment and Finding of No Significant Impact Related to the Proposed License Amendment to Increase Maximum Reactor Power Level. U.S. Environmental Protection Agency, Website: http:// www.epa.gov/fedrgstr/EPA-IMPACT/2007/December/Day-05/i23537.htm , Date accessed: February 5, 2008.

USGS, 2008. Estimated Water Withdrawals and Use in Pennsylvania, 1995. U.S. Geological Survey, Website: http://pa.water.usgs.gov/reports/fs174-99.html Date accessed: June 11, 2008.

USNRC,2006. Liquid Radioactive Release Lessons Learned Task Force, Final Report, U.S. Nuclear Regulatory Commission, Sept. 1, 2006.

USNRC, 2007. 10 CFR 20.1406, Minimization of Contamination, Sept. 28, 2007.

Williams, 1987. Groundwater Resources of the Berwick-Bloomsburg-Danville Area, East-Central Pennsylvania. Pennsylvania Bureau of Topographic and Geologic Survey, Water Resource Report 61, J.H. Williams and D.A. Eckhardt, 1987.

2.3.3.3 References

CFR, 2007a. U.S. Environmental Protection Agency, Title 40 Code of Federal Regulations, Part 141 "National Primary Drinking Water Regulations," Revised as of July 1, 2007.

CFR, 2007b. U.S. Environmental Protection Agency, Title 40 Code of Federal Regulations, Part 142 "National Primary Drinking Water Regulations Implementation," Revised as of July 1, 2007.

CFR, 2007c. U.S. Environmental Protection Agency, Title 40 Code of Federal Regulations, Part 143, "National Secondary Drinking Water Regulations," Revised as of July 1, 2007.

Ecology III, 2003-2007. Environmental Studies in the Vicinity of the Susquehanna Steam Electric Station, Water Quality and Fishes. Prepared for PPL Susquehanna, LLC.

NRC, 1981. Final Enviromental Statement Related to the Operation of Susquehanna Steam Electric Station, Unit 1 and 2, Docket Nos. 50-388, Pennsylvania Power and Light Company and Allegheny Electric Cooperative Inc. U.S. Nuclear Regulatory Commision Office of Nuclear Reactor Regulation, June 1981.

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

PADEP, 2005. Pennsylvania Department of Environmental Protection, Water Quality Toxics Management Strategy-Statement of Policy, Title 25, Pennsylvania Code, Subchapter A, Guidelines for Development of Criteria for Toxic Substances and Water Quality Criteria for Toxic Substances," Chapter 16, May 2005.

PADEP, 2006a. Pennsylvania Department of Environmental Protection Specific Water Quality Criteria for the Susquehanna River in the vicinity of the Susquehanna Steam Electric Station, 2006, (Included as Table 3 of Ecology III, 2007).

PADEP, 2006b. Pennsylvania Department of Environmental Protection, Division of Drinking Water Management, Maximum Contaminant Levels (MCLs) & Maximum Residual Disinfectant Levels (MRDLs), Title 25, Pennsylvania Code, Section 109.202, April 2006.

PADEP, 2007. Pennsylvania Department of Environmental Protection, Water Quality Standards, Title 25, Pennsylvania Code, Chapter 93, March 2007.

PADEP, 2008a. Pennsylvania Department of Environmental Protection, Permit List for Susquehanna Steam Electric Station - 250359, Accessed via eFACTS, Website: http:// www.dep.state.pa.us/efacts/search results.asp?varSiteID=250359&varSearchType=perm&varSearchSubType=site, Access date: June 25, 2008.

PADEP, 2008b. Pennsylvania Department of Environmental Protection, Pennsylvania's Major River Basins, Pennsylvania's Mighty Susquehanna, Website: http://www.dep.state.pa.us/river/ basininfo.htm#sus, Access date: June 27, 2008.

PPL, 2003-2007. Radiological Environmental Monitoring Report (REMP), within Annual Radiological Environmental Operating Report (REOR), Susquehanna Steam Electric Station Units 1 & 2, PPL Susquehanna, LLC, Berwick, PA, for years 2002 through 2007.

SRBC, 2006. Susquehanna River Basin Commission, Information Sheet, November 2006. Website: http://www.srbc.net/pubinfo/docs/ Susq%20River%20Basin%20General%20(11_06).pdf, Date accessed: June 27, 2008.

USEPA, 2002. United States Environmental Protection Agency, EPA 815-R-02-001, Radionuclides in Drinking Water: A Small Entity Compliance Guide, February 2002.

USEPA, 2003. United States Environmental Protection Agency. EPA 816-F-03-016, National Primary Drinking Water Standards Alphabetical List, June 2003, Website: http://www.epa.gov/ safewater/consumer/pdf/mcl.pdf, Accessed: July 11, 2008.

USEPA, 2004a. United States Environmental Protection Agency, Safe Drinking Water Act (SWDA) Basic Information, Website: http://www.epa.gov/safewater/sdwa/ basicinformation.html, Accessed: July 10, 2008.

USEPA, 2004b. United States Environmental Protection Agency, Safe Drinking Water Act (SWDA) Basic Information, Website: http://www.epa.gov/safewater/sdwa/30th/factsheets/ standard.html, Accessed: July 10, 2008.

USEPA, 2006. United States Environmental Protection Agency, EPA 822-R-06-013, 2006 Edition of the Drinking Water Standards and Health Advisories, August 2006.

USEPA, 2008a. United States Environmental Protection Agency, Drinking Water Contaminants, Website: http://www.epa.gov/safewater/contaminants/index.html, Access date: June 17, 2008.

USEPA, 2008b. United States Environmental Protection Agency, National Secondary Drinking Water Regulations, Website: http://www.epa.gov/safewater/contaminants/index.html#sec, Access date: May 28, 2008.

USEPA, 2008c. United States Environmental Protection Agency, Drinking Water Contaminants, Website: http://www.epa.gov/SAFEWATER/hfacts.html, Access date: June 16, 2008.

2.6.4 References

Berg, 1999. Part II, Stratigraphy and Sedimentary Tectonics, Chapter 8: Devonian-Mississippian Transition, in C.H. Shultz ed, The Geology of Pennsylvania: Pennsylvania Bureau of Topographic and Geologic Survey Special Publication 1, p 128-137, T.M. Berg, 1999.

Brezinski, 1999. Part II, Stratigraphy and Sedimentary Tectonics, Chapter 9: Mississippian, in C.H. Shultz ed, The Geology of Pennsylvania: Pennsylvania Bureau of Topographic and Geologic Survey Special Publication 1, p 138-147, D.K. Brezinski, 1999.

Crangle, 2002. Stratigraphic Framework of Cambrian and Ordovician Rocks in the Central Appalachian Basin from Medina County, Ohio, through Southwestern and South-Central Pennsylvania to Hampshire County, West Virginia, Revised and Digitized from Ryder, Stratigraphic Framework of Cambrian and Ordovician Rocks in the Central Appalachian Basin from Medina County, Ohio, through Southwestern and South-Central Pennsylvania to Hampshire County, West Virginia, R.D. Crangle Jr, 2002.

Crowl, 1999. Quaternary, The Geology of Pennsylvania, Part II: Stratigraphy and Sedimentary Tectonics, Chapter 15, p224-232, G.H. Crowl and W.D. Sevon, 1999.

DeLorme, 2006. Pennsylvania Atlas & Gazette, 9th Edition, Page 52, DeLorme, 2006.

Edmunds, 1999. Part II, Stratigraphy and Sedimentary Tectonics, Chapter 10: Pennsylvanian, in C.H. Shultz ed, The Geology of Pennsylvania: Pennsylvania Bureau of Topographic and Geologic Survey Special Publication 1, p 148-169, W.E. Edmunds, V.W. Skema, and N.K. Flint, 1999.

Fenneman, 2002. Physiographic Divisions in the Conterminous U.S., Map, USGS, Washington, DC, Fenneman, N.M., and Johnson, D.W., 2002.

Gold, 2003. Geological Report on the Skytop Road Cuts, Pennsylvania State University, Department of Geosciences, p 1-27, D.P. Gold and A.G. Doden, 2003.

Harper, 1999. Part II, Stratigraphy and Sedimentary Tectonics, Chapter 7: Devonian, in C.H. Shultz ed., The Geology of Pennsylvania: Pennsylvania Bureau of Topographic and Geologic Survey Special Publication 1, p 108-127, J.A. Harper, 1999.

Harper, 2004. Ordovincian Carbonates in Central Pennsylvania, Trenton and Black River Carbonates in the Union Furnace Area of Blair and Huntingdon Counties, Pennsylvania, A Field Trip Guidebook for the Eastern Section AAPG Meeting, J. Harper, September, 2003.

Inners, 1978. Geology and Mineral Resources of the Berwick Quadrangle, Luzerne and Columbia Counties, Pennsylvania, Pennsylvania Geological Survey, Fourth Series, p 1-34, J.D. Inners, 1978.

Kauffman, 1999. Part II Stratigraphy and Sedimentary Tectonics, Chapter 4: Eocambrian, Cambrian, and Transition to Devonian, in C.H. Shultz ed, The Geology of Pennsylvania: Pennsylvania Bureau of Topographic and Geologic Survey Special Publication 1, p 59-73, M.E. Kauffman, 1999.

Laughrey, 1999. Part II, Stratigraphy and Sedimentary Tectonics, Chapter 6: Silurian and Transition to Devonian, in C.H. Shultz ed, The Geology of Pennsylvania: Pennsylvania Bureau of Topographic and Geologic Survey Special Publication 1, p 91-107, C.D. Laughrey, 1999.

McElroy, 2007. Bedrock Geologic Map of the Allensville Quadrangle, Huntingdon, and Mifflin Counties, Pennsylvania, Pennsylvania Geological Survey, T.A. McElroy and D.M. Hoskins, 2007.

Ryder, 1992. Stratigraphic Framework of Cambrian and Ordovician Rocks in the Central Appalachian Basin from Medina County, Ohio, through Southwestern and South-Central Pennsylvania to Hampshire County, West Virginia, US Geological Survey Bulletin 1839, p 1-40, R.T. Ryder, A.G. Harris, and J.E. Repetski, 1992.

Sevon, 2000. Regolith in the Piedmont Upland Section, Piedmont Province, York, Lancaster and Chester Counties, Southeastern Pennsylvania, Southeastern Geology, Volume 39, No. 3 and 4, p 223-241, W. Sevon, October 2000.

SSES, 1975. Geology, Siesmology, and Geotechnical Engineering, SSES-FSAR, Revision 58, Section 2.5, 1975.

Thompson, 1999. Part II, Stratigraphy and Sedimentary Tectonics, Chapter 5: Ordovician, in C.H. Shultz ed, The Geology of Pennsylvania: Pennsylvania Bureau of topographic and Geologic Survey Special Publication 1, p 74-89, A.M. Thompson, 1999.

COLA Impact:
No changes to the BBNPP COLA are required as a result of this RAI response.

H 6.3-1

ESRP 6.3

Summary: *Provide descriptions of surface water and groundwater monitoring equipment, data collected, measurement schedule, analysis procedures, and data quality objectives for the preapplication, construction, preoperational and operational periods.*

Full Text: Staff needs additional information regarding the number of monitoring wells and surface water stations, what data have been and will be collected, and on what schedule. ESRP 6.3 requests details of all monitoring programs for the preapplication, construction, preoperational and operational periods. The SSES monitoring program includes the number of wells, their locations, and measurement values, stored in a monitoring data base.

Response: For each investigation phase: Preapplication, Construction, Pre-Operation, and Operation, information is provided for groundwater and surface water monitoring including:

- Monitoring Purpose
- Equipment
- Data
- Measurements
- Procedure/Analysis
- Frequency of Measurement
- Data Quality Objectives (DQO)

Data will be maintained and stored as part of BBNPP environmental programs. Data quality is a primary consideration for all phases of environmental monitoring and all categories of records. Procedural requirements will dictate specific Data Quality Objectives for all BBNPP monitoring data.

For the Preapplication phase, information was collected as part of site characterization studies and reported in licensing application submittals. Information for the other three project phases will be collected as described in ER Section 6.3 and this RAI response. Hydrological monitoring parameters are measured for both surface water and groundwater.

Surface Water (small creeks and ponds), Susquehanna River

Surface water monitoring for the BBNPP includes both the Susquehanna River and local smaller water bodies in and around the BBNPP site. The BBNPP relies on measurements made by the Susquehanna Steam Electric Station (SSES) for Susquehanna River water surface elevation and flow rate for all phases of monitoring.

Susquehanna River flow is monitored continuously by the SSES; data are compiled as Stage-Discharge Curves. Flow is measured daily upstream of the SSES intake structure. Stream flow rates are calculated using ASTM D3858-95 (Re-approved 2003). Plans are to continue to use SSES flow data for the BBNPP during construction and operation periods. The monitoring location used by SSES is applicable for the BBNPP. In addition to flow data, water quality samples are collected quarterly upstream and downstream of the SSES intake structure as part of that plant's monitoring programs.

As illustrated in ER Figure 2.3-33, Preapplication monitoring information included water quality measurements of small surface water bodies (site creeks and ponds) in and around the BBNPP site and for the Susquehanna River. This monitoring program will be extended into the Construction, Preoperation and Operational phases with adjustments made to address changing site conditions. The plan includes measurements for pH, temperature, specific conductance, dissolved oxygen, and for the creeks and ponds, Oxidation Reduction Potential (ORP), and turbidity. It entails the use of a YSI Model

Multi-Meter probe (or equivalent) and is performed on a quarterly basis using field calibration and measurements based on project procedures. As site activities become more stable during Pre-Operation and Operations, consideration will be given to changes in the scope and frequency of measurements. Measurements will be performed in accordance with project procedures, which will be amended as needed to allow for any changes in site conditions.

Site characterization monitoring has provided baseline, Preapplication information for monitoring of water flow in site creeks. This plan will be extended into Construction, Preoperation and Operational phases with adjustments made to address changing site conditions. Water flow will be measured in Walker Run and Unnamed Tributaries by developing cross-sectional water depth and velocity profiles for -five locations in creeks using a Marsh-McBirney (Hach) Flo-Mate Model 2000 flow meter (or equivalent), performed on a quarterly basis based on project procedures. Measurements will be performed in accordance with project procedures, which will be amended as needed to allow for adjustment to any new conditions.

Monitoring during construction will take into account those construction activities that specifically affect surface water. During construction, surface water discharges will also be monitored and regulated as part of a National Pollutant Discharge Elimination System (NPDES) Construction General Permit that requires implementation of an Erosion/Sediment Control Plan and Stormwater Management Plan as well as a U.S. Army Corps of Engineers Clean Water Act 404 Permit and a PA DEP 401 Water Quality Certification. These permits will entail further sampling requirements.

When construction is completed and surface water conditions return to a more stable state, the monitoring scope and schedule will be re-evaluated again to assure required data collection is provided.

An NPDES permit tailored to plant operation discharges will also be implemented for this phase of the project with appropriate monitoring added or modified, as required for that permit. Water withdrawals will be regulated by a permit issued by the Susquehanna River Basin Commission (SRBC) which will likely require daily monitoring of river water withdrawals and discharges. Current SSES NPDES monitoring requirements are detailed in ER Tables 6.3-1 and 6.6-1.

Groundwater Monitoring

Site characterization monitoring completed to-date has provided preliminary baseline, Preapplication information for groundwater. Modified monitoring plans will be implemented during Construction, Preoperation and Operational phases. Monitoring during construction will take into account those construction activities that specifically affect groundwater.

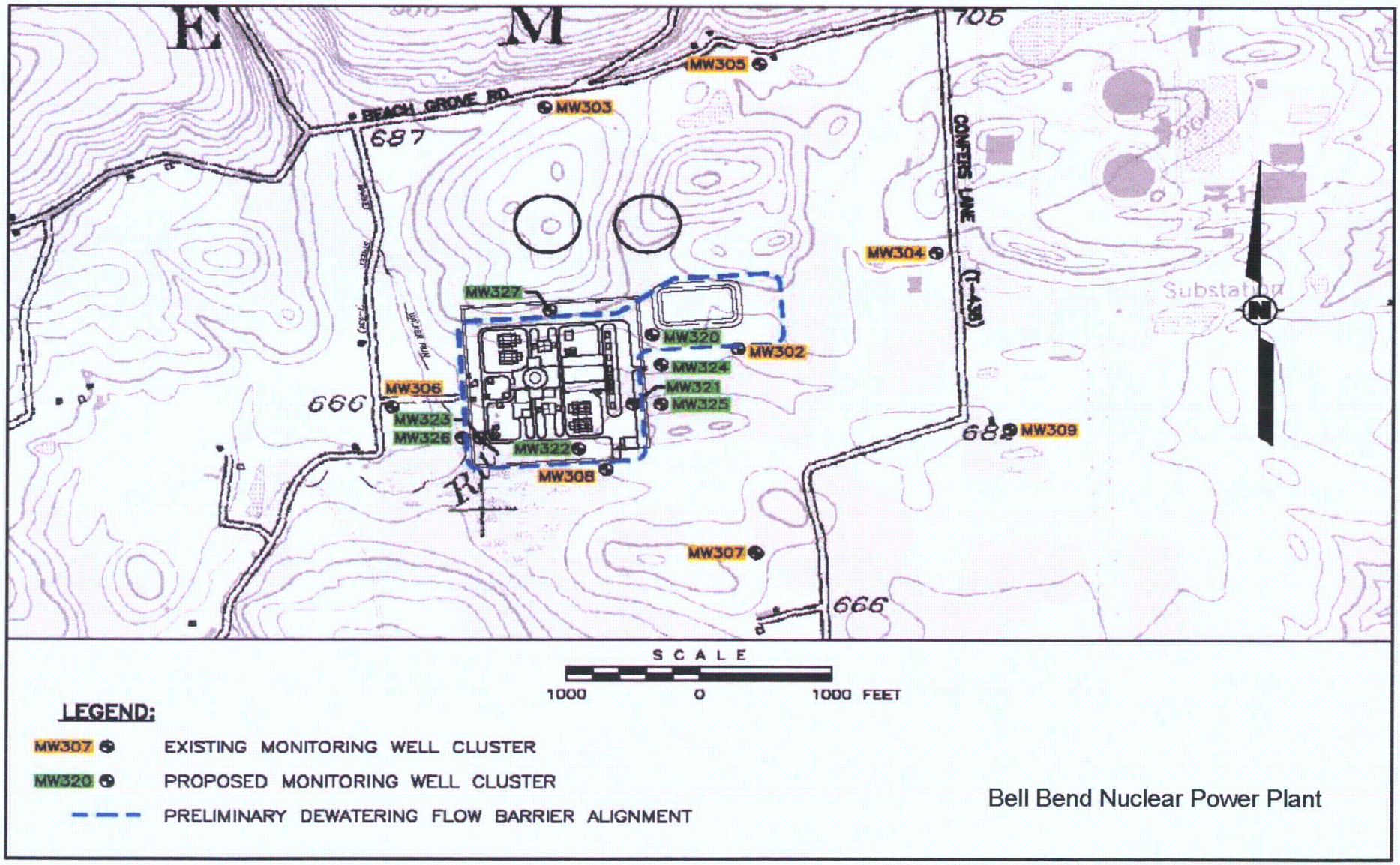
Future groundwater monitoring will be performed using a combination of existing monitoring wells (used for Preapplication site characterization) and proposed new wells installed prior to or during construction, including monitoring for control of any dewatering efforts. Attached Figure 1 shows the locations of eight monitoring wells expected to be left in place (MW-302 through -309) and monitored during construction and eight proposed additional wells (MW-320 through -327). Specifications for existing wells are listed in ER Table 2.3-18. Anticipated specifications for proposed monitoring wells MW-320 through-327 which would be installed prior to or during construction, are provided in attached Table 1. The proposed configuration of monitoring wells during construction may be revised depending on any additional Preapplication data collection efforts, on construction activities, and the final layout of any groundwater flow barrier which is part of the current conceptual dewatering plan, as shown on attached Figure 1. Monitoring equipment includes electronic depth probes, to provide water depths and a YSI Model 6 Series Multi-Probe Meter or equivalent to field-measure pH, temperature, specific conductance, dissolved oxygen, ORP, and turbidity. Monitoring and measurements will be done on a quarterly basis.

A schedule and scope for longer term monitoring of such wells during Operation will depend, to some extent, on the results obtained during the construction phase. Once construction is completed and groundwater conditions return to a more stable state during BBNPP operations, monitoring scope and schedule will again be assessed to determine the long-term monitoring needs of the process.

Table 1 Proposed Monitoring Wells to be Installed Prior to or During Construction

Proposed Monitoring Well Additions	Water-Bearing Zone	Approximate Well Depth (ft bgs)	Purpose
MW320A	Glacial Overburden inside flow barrier	40 - 60	Monitor groundwater elevation inside the groundwater flow barrier
MW320B	Shallow Bedrock	100 - 150	Monitor groundwater elevation in bedrock beneath the engineered backfill
MW321A	Glacial Overburden inside flow barrier	40 - 60	Monitor groundwater elevation inside the groundwater flow barrier
MW321B	Shallow Bedrock	100 - 150	Monitor groundwater elevation in bedrock beneath the engineered backfill
MW322A	Glacial Overburden inside flow barrier	40 - 60	Monitor groundwater elevation inside the groundwater flow barrier
MW322B	Shallow Bedrock	100 - 150	Monitor groundwater elevation in bedrock beneath the engineered backfill
MW323A	Glacial Overburden inside flow barrier	40 - 60	Monitor groundwater elevation inside the groundwater flow barrier
MW323B	Shallow Bedrock	100 - 150	Monitor groundwater elevation in bedrock beneath the engineered backfill
MW324A	Glacial Overburden outside flow barrier	40 - 60	Monitor groundwater elevation outside the groundwater flow barrier
MW324B	Shallow Bedrock	100 - 150	Monitor groundwater elevation in shallow bedrock outside the groundwater flow barrier
MW325A	Glacial Overburden outside flow barrier	40 - 60	Monitor groundwater elevation outside the groundwater flow barrier
MW325B	Shallow Bedrock	100 - 150	Monitor groundwater elevation in shallow bedrock outside the groundwater flow barrier
MW326A	Glacial Overburden outside flow barrier	40 - 60	Monitor groundwater elevation outside the groundwater flow barrier
MW326B	Shallow Bedrock	100 - 150	Monitor groundwater elevation in shallow bedrock outside the groundwater flow barrier
MW327B	Shallow Bedrock	100 - 150	Monitor groundwater elevation in shallow bedrock outside the groundwater flow barrier

Figure 1 Locations of Groundwater Monitoring Wells



COLA Impact:
ER Section 6.3 will be revised as follows in a future revision of the COLA:

6.3 HYDROLOGICAL MONITORING

This section describes the hydrological monitoring program that will be implemented to monitor the effects of the BBNPP. Elements of the hydrological program relating to thermal, radiological, and chemical monitoring are described separately in Section 6.1, Section 6.2, and Section 6.6, respectively.

This section includes the pre-application monitoring program that discusses the existing hydrological monitoring program at the SSES site as well as the BBNPP site, and the programs to monitor BBNPP during the construction/pre-operational and operational phases.

Section 2.3.1 describes the vicinity watershed and stream flow data collected by the U.S. Geological Survey and the Pennsylvania Geological Survey. Groundwater velocities are discussed in Section 2.3.1.2. Flow rates are discussed in Section 2.3.1.1 and Table 2.3-2 and Table 2.3-7. Stream bank erosion is discussed in Sections 2.4.2, 4.2.1, 4.2.2, 4.3.1, and 4.3.2. Section 2.3.2 describes surface and groundwater uses. Features of the BBNPP site, including boundaries and bathymetry of all surface water bodies adjacent to the site are provided in Section 2.3.1. The locations of groundwater monitoring wells are provided in Figure 2.3-32. The surface water monitoring locations are shown on Figure 2.3-33. The existing thermal and ecological monitoring stations are discussed in Section 6.1 and Section 6.5 for surface water. No thermal or ecological monitoring stations exist for groundwater and none are planned. Figures showing major geomorphic features and regional geology are shown in Section 2.3.1 and Section 2.6.

Preapplication monitoring programs will be extended as needed to Construction, Preoperation and into Operational phases with adjustments made to the scope and frequency of monitoring to address changing site conditions and the potential impacts associated with each phase. Monitoring data will be maintained and stored as part of BBNPP environmental programs. Procedural requirements will dictate specific Data Quality Objectives for BBNPP monitoring data.

RHH 4.5-2

ESRP 4.5

Summary: *Provide input data and input files for code(s) used to estimate construction worker dose. Provide assumptions and access to calculation package(s) used for dose calculations to construction workers. Provide breakdown of doses from gaseous effluents, liquid effluents, and direct exposure. Include updated calculations of BBNPP construction worker doses using the projected 2017 ISFSI inventory based on ISFSI storage of SSES fuel with shorter decay times than used for the original calculations in the ER.*

Full Text: Need to perform confirmatory analyses for the construction worker dose results in ER Section 4.5. Provide a breakdown of construction worker doses by pathway.

During site audit applicant indicated that fuels with shorter out of reactor time may be stored in the SSES ISFSI. If this is the case, the direct dose to construction workers should be re-evaluated to assure that doses do not exceed the 10 CFR 20.1301 dose limits for the public.

Response: Input data for codes used to estimate construction worker dose can be found in the following calculation packages available for NRC inspection through the PPL reading room:

- 32-9074035-000,
- 32-9079799-001,
- 32-9082288-001,
- 32-9084600-001,
- 32-9084874-001,
- 51-9085217-001

Gaseous dose rates are modeled using the YODA and ODA2 code suites, both of which are described within the calculation packages available for NRC inspection through the PPL reading room. GASPAR II was not used as it does not account for the calculation of total effective dose equivalent (TEDE). YODA and ODA2 input files are included on the accompanying CD. In addition, a confirmatory GASPAR II run was made to ensure that the YODA and ODA2 codes produced similar results to GASPAR II. This input file is also included on the accompanying CD.

Liquid dose rate input data and files can be found in the response to BBNPP ER RAI RHH 4.5 1.

Direct doses are modeled using MicroShield 7.02. Input files are included on the accompanying CD.

Skyshine doses are modeled using MicroSkyshine 2.10. Input files are included on the accompanying CD.

The ISFSI (32-9082288-001) and total dose (32-9084874-002) calculations did not employ a code; Microsoft Excel spreadsheets were used. Therefore, no input files related to these calculations are provided. The dose contours were created using Surfer 8. This software served only to graph the data.

The following input files are included on the attached CD:

YODA & ODA2 Files (AREVA Calculation 32-9079799-001):

Date/Time	File Name	Description
8/31/2009 3:51 PM	Ypif	YODA program information file
8/31/2009 3:51 PM	Query	YODA/ODA2 Query file
8/31/2009 3:51 PM	grdBB	YODA/ODA2 X/Q data file
8/31/2009 3:51 PM	Opif	ODA2 program information file
8/31/2009 3:51 PM	SSGAS01	2001 gaseous effluent release data
8/31/2009 3:51 PM	SSGAS02	2002 gaseous effluent release data
8/31/2009 3:51 PM	SSGAS03	2003 gaseous effluent release data
8/31/2009 3:51 PM	SSGAS04	2004 gaseous effluent release data
8/31/2009 3:51 PM	SSGAS05	2005 gaseous effluent release data
8/31/2009 3:51 PM	SSGAS06	2006 gaseous effluent release data

GASPAR Files (AREVA Calculation 32-9079799-001):

Date/Time	File Name	Description
8/31/2009 3:51 PM	bb-const.inp	GASPAR confirmatory analysis

MicroSkyshine Files (AREVA Calculation 32-9084600-001):

Date/Time	File Name	Description
8/31/2009 3:51 PM	CST Part A. sky2	Skyshine dose from first 1/3 of CST
8/31/2009 3:51 PM	CST Part B. sky2	Skyshine dose from second 1/3 of CST
8/31/2009 3:51 PM	CST Part C. sky2	Skyshine dose from third 1/3 of CST
8/31/2009 3:51 PM	SEALAND. sky2	Skyshine dose from SEALAND containers
8/31/2009 3:51 PM	Steam Dryers.sky2	Skyshine dose from steam dryers
8/31/2009 3:51 PM	Unit 1 East CAP.sky2	Skyshine dose from Unit 1 east cross-around piping
8/31/2009 3:51 PM	Unit 1 East CIV Piping.sky2	Skyshine dose from Unit 1 east combined intermediate valve piping
8/31/2009 3:51 PM	Unit 1 East CIVs.sky2	Skyshine dose from Unit 1 east combined intermediate valves
8/31/2009 3:51 PM	Unit 1 East Horizontal HPT Inlet Piping.sky2	Skyshine dose from Unit 1 east horizontal high pressure turbine inlet piping
8/31/2009 3:51 PM	Unit 1 East MS.sky2	Skyshine donse from Unit 1 east moisture separator
8/31/2009 3:51 PM	Unit 1 East Vertical HPT Inlet Piping.sky2	Skyshine dose from Unit 1 east vertical high pressure turbine inlet piping
8/31/2009 3:51 PM	Unit 1 HPT.sky2	Skyshine dose from Unit 1 high pressure turbine
8/31/2009 3:51 PM	Unit 1 LPT.sky2	Skyshine dose from Unit 1 low pressure turbine

8/31/2009 3:51 PM	Unit 1 West CAP.sky2	Skyshine dose from Unit 1 west cross-around piping
8/31/2009 3:51 PM	Unit 1 West CIV Piping.sky2	Skyshine dose from Unit 1 west combined intermediate valve piping
8/31/2009 3:51 PM	Unit 1 West CIVs.sky2	Skyshine dose from Unit 1 west combined intermediate valves
8/31/2009 3:51 PM	Unit 1 West Horizontal HPT Inlet Piping.sky2	Skyshine dose from Unit 1 west horizontal high pressure turbine inlet piping
8/31/2009 3:51 PM	Unit 1 West MS.sky2	Skyshine donse from Unit 1 west moisture separator
8/31/2009 3:51 PM	Unit 1 West Vertical HPT Inlet Piping.sky2	Skyshine dose from Unit 1 west vertical high pressure turbine inlet piping
8/31/2009 3:51 PM	Unit 2 East CAP.sky2	Skyshine dose from Unit 2 east cross-around piping
8/31/2009 3:51 PM	Unit 2 East CIV Piping.sky2	Skyshine dose from Unit 2 east combined intermediate valve piping
8/31/2009 3:51 PM	Unit 2 East CIVs.sky2	Skyshine dose from Unit 2 east combined intermediate valves
8/31/2009 3:51 PM	Unit 2 East Horizontal HPT Inlet Piping.sky2	Skyshine dose from Unit 2 east horizontal high pressure turbine inlet piping
8/31/2009 3:51 PM	Unit 2 East MS.sky2	Skyshine donse from Unit 2 east moisture separator
8/31/2009 3:51 PM	Unit 2 East Vertical HPT Inlet Piping.sky2	Skyshine dose from Unit 2 east vertical high pressure turbine inlet piping
8/31/2009 3:51 PM	Unit 2 HPT.sky2	Skyshine dose from Unit 2 high pressure turbine
8/31/2009 3:51 PM	Unit 2 LPT.sky2	Skyshine dose from Unit 2 low pressure turbine
8/31/2009 3:51 PM	Unit 2 West CAP.sky2	Skyshine dose from Unit 2 west cross-around piping
8/31/2009 3:51 PM	Unit 2 West CIV Piping.sky2	Skyshine dose from Unit 2 west combined intermediate valve piping
8/31/2009 3:51 PM	Unit 2 West CIVs.sky2	Skyshine dose from Unit 2 west combined intermediate valves
8/31/2009 3:51 PM	Unit 2 West Horizontal HPT Inlet Piping.sky2	Skyshine dose from Unit 2 west horizontal high pressure turbine inlet piping
8/31/2009 3:51 PM	Unit 2 West MS.sky2	Skyshine donse from Unit 2 west moisture separator
8/31/2009 3:51 PM	Unit 2 West Vertical HPT Inlet Piping.sky2	Skyshine dose from Unit 2 west vertical high pressure turbine inlet piping

MicroShield Files (AREVA Calculation 32-9084600-001):

Date/Time	File Name	Description
8/31/2009 3:51 PM	LLRWHF.ms7	Direct dose from LLRWHF
8/31/2009 3:51 PM	SEALAND.ms7	Direct dose from SEALAND containers
8/31/2009 3:51 PM	Steam Dryers.ms7	Direct dose from steam dryers
8/31/2009 3:51 PM	Unit 1 LPT.ms7	Direct dose from Unit 1 low pressure turbine
8/31/2009 3:51 PM	Unit 1 West Moisture Separator.ms7	Direct dose from Unit 1 west moisture separator
8/31/2009 3:51 PM	Unit 2 HPT.ms7	Direct dose from Unit 2 high pressure turbine
8/31/2009 3:51 PM	Unit 2 West CAP.ms7	Direct dose from Unit 2 west cross-around piping
8/31/2009 3:51 PM	Unit 2 West Moisture Separator.ms7	Direct dose from Unit 2 west moisture separator

Assumptions can be found within the following calculation packages, which are available for NRC inspection through the PPL reading room:

- 32-9074035-000,
- 32-9079799-001,
- 32-9082288-001,
- 32-9084600-001,
- 32-9084874-001,
- 51-9085217-001

The breakdown of construction worker dose in 2017 by pathway at the maximum location (on Confers Lane west of the SSES Unit 1 cooling tower) based on 2200 hr/yr occupancy is as follows:

Pathway	**Dose (mrem/yr)**
Liquid Effluents (0.41 mrem if on the shoreline; otherwise, 0)	0
Gaseous Effluents	0.79
Direct/Skyshine Sources	
Condensate Storage Tanks	0.00
LLRWHF	1.86
SEALAND Containers	0.64
Steam Dryer Storage Vault	0.29
Turbine Building	0.04
ISFSI	13.06
Total	16.7

The breakdown at other locations can be found within the following calculation packages available for NRC inspection through the PPL reading room:

- 32-9074035-000,
- 32-9079799-001,
- 32-9082288-001,
- 32-9084600-001,
- 32-9084874-001,
- 51-9085217-001

The calculations of BBNPP construction worker dose do not require revision in response to this RAI. The projected ISFSI storage of SSES fuel will not have shorter decay times than the original ER calculations.

COLA Impact:
ER Section 4.5 will be revised as follows in a future revision of the COLA:

4.5.5.1 10 CFR 20.1301

The 10 CFR 20.1301 regulations limit annual doses from licensed operations to individual members of the public to 100 mrem (1 mSv) total effective dose equivalent (TEDE). In addition, the dose rate from external sources to unrestricted areas must be less than 2 mrem (20 μSv) in any one hour. This applies to the public both outside and within controlled areas. Given that the relevant sources are relatively constant in time, the hourly limit is met if the annual limit is met.

Dose rates in each 104 ft (32 m) by 97 ft (30 m) block of the plant grid are calculated and the array of dose rates searched for the maximum in the construction zones. The maximum dose rates by zone are given in Table 4.5-13. for an occupational year, i.e., 2200 hours on site, the maximum dose would be on Confers Lane west of SSES Unit 1 cooling tower where the dose is ~~14.2~~ 16.7mrem (~~142~~ 167μSv). This assumes the worker stood on Confers Lane for all working hours in one year. This is less than 100 mrem (1 mSv), thus, it meets the criterion and therefore construction workers can be considered to be members of the general public, for the purpose of radiation protection.

and

Table 4.5-13: Maximum Dose by Zone for 2200 Hours

Zone	Zone Description	Maximum Dose Rate μSv/2200 hours (mrem/2200 hours)
B	Batch Plant	12.0(1.20)
C	Construction on main structures	3.6 (0.36)
L	Laydown	~~10.4~~ 10.7(~~1.04~~ 1.07)
O	Office/Trailer	6.1 (0.61)
P	Parking	8.2 (0.82)
R	Roads	~~141.5~~ 167 (~~14.15~~ 16.7)
S	Shoreline, tunnel, barge, in/out flow	7.2 (0.72)
T	Tower/Basin/Desalinization	4.9 (0.49)
W	Warehouse	5.5 (0.55)

SE 2.5-3

ESRP 2.5.2

Summary: *Provide a breakdown of the number of construction workers by relevant sub-groups, including iron workers, pipe fitters, and other trades, and the number of unemployed construction workers in the ROI and within a 50-mile radius of BBNPP.*

Full Text: None.

Response: A summary of information available with respect to construction employment and labor force unemployment within the 50-mile area from the United States Census Bureau (USCB), United States Bureau of Labor Statistics (BLS), and the Pennsylvania Department of Labor and Statistics (PDLS) is presented below. The tables provided within this response depict the number of construction workers either by county or by Metropolitan Statistical Area (MSA). Information also is provided regarding the overall employment and unemployment rates by county or MSA.

Telephone interviews were also conducted with local unions to identify union membership and unemployment levels, as of August 2009.

Construction Employment

United States Census Bureau

The USCB provides estimates of employment levels for the 2005-2007 period at the county level from the American Community Survey (USCB, 2008). This survey provides estimates for geographic areas with 20,000 or more people, which does not include Montour, Pike, and Sullivan counties. Table 1 shows the total number of 16 year olds and older who were employed, and those 16 years old and older that were employed in the construction industry, in the 22 counties that are wholly or partially within the 50-mile radius of the BBNPP project site. Estimates of unemployed workers were not available from the American Community Survey.

There were a total of about 1.35 million employed people in the counties of the 50-mile radius during the 2005-2007 period, of which over 89,000 worked in the construction industry. Of these totals, there were a total of 173,976 employed in the two-county ROI, and 10,742 were employed in the construction industry.

Table 1: County-level Employment Estimates for 50-mile Area, 2005-2007

County	Employed Population 16 Years Old and Older	
	Total	Construction
Berks	196,087	12,666
Bradford	27,096	1,519
Carbon	29,083	2,836
Columbia	30,043	2,126
Dauphin	128,831	6,522
Lackawanna	98,269	5,555
Lebanon	64,029	4,471
Lehigh	160,703	9,746
Luzerne	143,933	8,616
Lycoming	54,733	4,257
Monroe	75,921	6,718
Montour	n/a	n/a
Northampton	142,579	8,770
Northumberland	41,658	2,551
Pike	n/a	n/a
Schuylkill	64,710	4,469
Snyder	18,645	1,094
Sullivan	n/a	n/a
Susquehanna	19,061	1,891
Union	17,439	1,332
Wayne	21,898	2,577
Wyoming	13,150	1,299
Total	**1,347,868**	**89,015**

Source: USCB, 2008.

The USCB also presents estimates of employment that are categorized by occupation and sex based upon year 2000 census data, including construction trades workers (USCB, 2000). Table 2 presents the total number of construction trade workers within the 22 counties that lie wholly or partially within the 50-mile radius of the BBNPP site. As can be seen in the table, 58,758 people were employed as construction trades workers in 2000. Of this number, 7,784 were employed in the two-county ROI.

Based upon the data provided in Tables 1 and 2, the total number of construction workers could potentially exceed the BBNPP estimated peak workforce needs within the 50-mile area, but the USCB data does not allow for an assessment of what portion of the construction workforce has appropriate skills that would be applicable to the heavy construction industry and is unemployed, so that this portion would be available to work on the project.

Table 2: County Construction Trades Workers Employment for 50-mile Area, 2000

County	Construction and Extraction Occupations, Construction Trades Workers
Berks	7,351
Bradford	1,200
Carbon	1,662
Columbia	1,380
Dauphin	4,417
Lackawanna	3,744
Lebanon	2,679
Lehigh	5,891
Luzerne	6,404
Lycoming	2,478
Monroe	3,514
Montour	318
Northampton	5,355
Northumberland	2,257
Pike	1,230
Schuylkill	3,503
Snyder	1,166
Sullivan	223
Susquehanna	1,016
Union	790
Wayne	1,431
Wyoming	749
Total	**58,758**

Source: USCB, 2000.

In addition to the general information on construction employment presented in Tables 1 and 2, the USCB also provides more detailed data on employment within various sectors of the construction industry by NAICS code (USCB, 2006). Table 3 provides the number of paid employees by industry group within the 22 counties that lie wholly or partially within the 50-mile radius of the BBNPP site. Paid employees consist of full and part-time employees, including salaried officers and executives of corporations, who were on the payroll in March 2006. Included within this number are employees on paid sick leave, holidays, and vacations. The information provided does not include proprietors or partners of unincorporated businesses.

As shown in Table 3, within the 50-mile radius of the BBNPP site, at least 49,179 paid workers were employed by the construction industry as defined by NAICS code 23 in 2006. Of this amount, 12,735 were involved in the construction of buildings, 4,404 were involved in heavy and civil engineering construction, and 31,347 were involved in specialty trade construction. Within these three categories, employment levels were estimated for the following subcategories of potential relevance to plant construction among others:

- 377 – Industrial Building Construction
- 1,694 – Highway Street and Bridge Construction
- 1,315 - Poured Concrete Structure Contractors
- 225 - Steel and Precast Concrete Contractors
- 4,994 - Electrical Contractors
- 7,076 - Plumbing and HVAC Contractors; and
- 3,651 - Site Preparation Contractors

The category and subcategory totals do not include counties in which employment was characterized by providing a range for a particular sector instead of an exact number. Therefore, construction employment may actually have been greater than the total numbers suggest in most if not all categories.

Within the ROI, 6,375 paid employees were in the construction industry in 2006. Of this amount, 1,897 were involved in the construction of buildings, 906 were involved in heavy and civil engineering construction, and 3,572 were involved in specialty trade construction. Thus, based on the data presented in Table 3, the total number of construction workers could potentially exceed the needs of the BBNPP estimated peak workforce needs within the 50-mile area. Although Table 3 does provide more detailed information than Tables 1 and 2 on employment within specific construction sectors, it still allows for only a limited assessment of what portion of the construction workforce has appropriate skills that would be applicable to the heavy construction industry and is unemployed, so that this portion would be available to work on the project.

Table 3: County Employment for the 50-mile Area by Economic Sector, Sub-Sector, Industry Group, and Industry: Construction, 2006
(Page 1 of 3)

County	Construction (23)	Construction of Buildings (236)	Industrial Building Construction (23621)	Heavy and Civil Engineering Construction (237)	Highway, Street, and Bridge Construction (2373)	Specialty Trade Contractors (238)	Building Foundation and Exterior Contractors (2381)	Poured Concrete Structure Contractors (23811)
Berks	7,385	1,520	62	508	249	5,357	1,082	198
Bradford	463	172		9	a	282	83	30
Carbon	565	c		b	a	348	92	20
Columbia	1,027	273	a	229	75	525	183	4
Dauphin	6,041	2,031	c	304	120	3,706	657	83
Lackawanna	2,784	890	28	149	a	1,745	430	55
Lebanon	1,910	427	21	125	b	1,358	171	4
Lehigh	7,022	1,815	246	360	152	4,847	1,028	299
Luzerne	5,348	1,624	b	677	260	3,047	503	100
Lycoming	2,085	436		464	290	1,185	215	85
Monroe	2,683	918	a	136	102	1,629	403	78
Montour	138	66		20	a	52	b	a
Northampton	5,175	950		662	311	3,563	1,098	258
Northumberland	1,048	440		33	a	575	184	82
Pike	478	183		49	a	246	32	a
Schuylkill	1,679	532	20	262	110	885	321	17
Snyder	622	168	a	25	25	429	b	a
Sullivan	78	b				b		
Susquehanna	322	b		a	a	232	85	2
Union	671	c	a	a	a	502	95	a
Wayne	1,352	290		392	b	670	124	a
Wyoming	303	c		a		164	b	a
Totals*	**49,179**	**12,735**	**377**	**4,404**	**1,694**	**31,347**	**6,786**	**1,315**

Table 3: County Employment for the 50-mile Area by Economic Sector, Sub-Sector, Industry Group, and Industry: Construction, 2006 (Cont'd)
(Page 2 of 3)

County	Steel and Precast Concrete Contractors (23812)	Masonry Contractors (23814)	Building Equipment Contractors (2382)	Electrical Contractors (23821)	Plumbing and HVAC Contractors (23822)	Drywall and Insulation Contractors (23831)	Painting and Wall Covering Contractors (23832)	Finish Carpentry Contractors (23835)	Site Preparation Contractors (23891)
Berks	b	401	2,315	830	1,283	201	207	157	831
Bradford		a	91	14	77	a		a	49
Carbon	a	21	133	71	b		18	15	55
Columbia	a	142	165	26	139	20	15	30	85
Dauphin	a	159	1,719	562	971	548	168	78	223
Lackawanna	b	129	892	412	450	34	15	80	107
Lebanon		65	715	365	e	117	32	97	133
Lehigh	b	248	2,614	1,037	1,418	153	250	189	250
Luzerne		106	1,524	516	945	137	303	145	327
Lycoming	a	19	723	181	433	40	24	18	118
Monroe	b	100	855	488	e	20	41	44	181
Montour		a	b	a	17	a			a
Northampton	225	272	989	252	676	511	170	115	518
Northumberland		42	197	b	108	a	4	b	61
Pike		13	113	b	58	a	7	12	62
Schuylkill	c	a	267	139	128	78	15	17	116
Snyder		a	127	27	100	a	a	a	b
Sullivan			a	a	a		a		a
Susquehanna	a	b	41	30	11	a		a	48
Union		42	173	a	152	a	14	a	169
Wayne	b	39	199	b	110	a	23	26	262
Wyoming		14	74	44	b	a	a	a	56
Totals*	**225**	**1,812**	**13,926**	**4,994**	**7,076**	**1,859**	**1,306**	**1,023**	**3,651**

Table 3: County Employment for the 50-mile Area by Economic Sector, Sub-Sector, Industry Group, and Industry: Construction, 2006 (Cont'd)
(Page 3 of 3)

Source: USCB, 2006.
Notes:

a = 0 to 19 employees
b = 20 to 99 employees
c = 100 to 249
employees
d = is not used by the USCB in this table
e = 250 to 499
employees
* Totals do not include counties characterized by employment ranges a-e as noted above

Unemployment

Bureau of Labor Statistics

Telephone conversations with the Bureau of Labor Statistics (BLS) industry specialists indicated that county-level unemployment by sector is not available.

The following provides a summary of the data that is available from the BLS:

> The Local Area Unemployment Statistics (LAUS) program - This resource includes monthly estimates of total labor force, employment, unemployment, and the unemployment rate for more than 7,300 geographic areas, including counties. However, these data are not broken down by demographic characteristics, such as industry or occupation.
>
> The Current Population Survey (CPS) - This data includes a limited amount of annual average data for the construction industry or occupational group. However, the BLS does not publish data for counties, because not all counties are represented in the state samples. Unemployment rates for construction occupations for 50 large metropolitan areas and 17 central cities are available, but these figures are often dated; the most current available data pertain to 2004. The only Pennsylvania areas included are the Philadelphia PMSA and Pittsburgh MSA (1990 Census definition).

Pennsylvania Department of Labor and Statistics

The Pennsylvania Department of Labor and Statistics (PDLS) aggregates data by selected Metropolitan and Micropolitan Areas (MSAs) for various employment sectors. This department groups the construction, mining, and forestry sectors into one category. County unemployment figures represent civilian industries and professions. Unemployment figures by industry are not available at the county or MSA level, according to conversations with this department. Tables 4 and 5 provide a summary of the available data from the PDLS (PDLS, 2009a-c). Table 4 shows that, similar to national trends, employment levels have decreased since July 2008.

Table 4: Employment Estimates for Metropolitan and Micropolitan Statistical Areas (MSAs) within 50 Miles of BBNPP: Construction, Mining, and Forestry

MSA	Employment			
	July 2008	May 2009	June 2009	July 2009
Allentown, Bethlehem	16,900	15,100	15,500	15,600
Scranton, Wilkes-Barre	11,600	9,800	10,100	10,200
Berwick, Bloomsburg	1,700	1,400	1,500	1,600

Source: PDLS, 2009a-c.

Table 5 includes the unemployment rates for trades and professions (i.e., the overall unemployment rate) for selected MSAs within Pennsylvania. Again, this table shows that unemployment levels are high, but are somewhat below the national average of about 9.5% for the same period.

Table 5: Unemployment Rates for MSAs, July 2009

MSA	Unemployment Rate (%), July 2009
Allentown, Bethlehem	9.2
Scranton, Wilkes-Barre	9.1
Berwick, Bloomsburg	8.3

Source: PDLS, 2009a-c.

Center for Workforce Information and Analysis

Table 6 provides a summary of county-level employment and unemployment statistics for counties located wholly or partially within a 50-mile radius of the BBNPP site. The data was compiled from the Center for Workforce Information and Analysis (CWIA) statistics (CWIA, 2009).

As shown in Table 6, an annual average of 1.4 million people were employed in the 22 county area in 2008 and 86,200 people (5.7%) were unemployed. In the month of July 2009, the region experienced an increase in unemployment with 1.4 million people employed and 136,600 (8.9%) unemployed. Within the two-county ROI, an annual average of 12,300 people were not employed in 2008, and 18,500 people were not employed in July 2009.

Table 6: County-Level Employment Statistics within 50 Miles of BBNPP, 2008 and 2009

County	Annual Average, 2008[1]				July 2009[2]			
	Civilian Labor Force	Employed	Unemployed	Unemployment Rate (%)[3]	Civilian Labor Force	Employed	Unemployed	Unemployment Rate (%)[3]
Berks	204,500	193,500	11,000	5.4	207,000	187,900	19,100	9.2
Bradford	30,800	29,200	1,600	5.4	31,300	28,800	2,500	7.8
Carbon	31,300	29,200	2,100	6.8	31,800	28,600	3,200	10.1
Columbia	36,000	33,900	2,100	5.9	36,900	33,800	3,100	8.6
Dauphin	136,800	130,300	6,500	4.7	139,300	128,200	11,100	8.0
Lackawanna	107,500	101,200	6,300	5.9	108,900	99,500	9,400	8.6
Lebanon	72,600	69,600	3,000	4.2	73,400	68,300	5,100	6.9
Lehigh	177,100	167,000	10,100	5.7	179,600	163,100	16,500	9.2
Luzerne	160,500	150,300	10,200	6.3	163,200	147,800	15,400	9.4
Lycoming	60,000	56,400	3,600	6.0	60,000	54,600	5,400	9.0
Monroe	83,600	78,400	5,200	6.3	87,800	79,800	8,000	9.1
Montour	9,400	9,000	400	4.8	9,600	8,900	700	7.1
Northampton	152,800	144,300	8,500	5.6	154,800	140,900	13,900	8.9
Northumberland	47,600	44,400	3,200	6.7	49,700	44,900	4,800	9.8
Pike	27,900	26,000	1,900	6.8	28,400	26,000	2,400	8.4
Schuylkill	73,900	69,300	4,600	6.3	76,700	68,900	7,800	10.1
Snyder	19,600	18,400	1,200	6.2	19,900	18,300	1,600	8.2
Sullivan	3,000	2,800	200	5.8	3,100	2,800	300	8.4
Susquehanna	21,700	20,500	1,200	5.6	21,700	20,100	1,600	7.2
Union	17,600	16,500	1,100	6.3	18,000	16,400	1,600	9.1
Wayne	25,500	24,200	1,300	5.3	27,500	25,700	1,800	6.5
Wyoming	14,500	13,600	900	6.1	14,600	13,300	1,300	8.7
Totals	**1,514,200**	**1,428,000**	**86,200**	**5.7**	**1,543,200**	**1,406,600**	**136,600**	**8.9**

Source: CWIA, 2009.

Notes:
1. Annual average data for 2008
2. In the month of July, not seasonally adjusted
3. The unemployment rates are presented as obtained from the CWIA. The numbers may vary from a hand-calculation of the presented data (i.e., the number of unemployed divided by the civilian labor force) as a result of the data being rounded to the nearest hundred.

Union Workforce Availability

Table 7 provides a listing of local unions contacted with at least a portion of their memberships residing within the 50-mile area surrounding the project location during August 2009, as well as the total number of members and unemployed workers. As shown in Table 7, for the unions that were contacted and provided data, total union worker membership 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.

As indicated in ER Section 4.4.2 Table 4.4-5, an estimated 474 electricians/instrument fitters, 448 pipefitters, and 474 iron workers would be needed to build the BBNPP during the peak construction period. Thus, based upon August 2009 union member unemployment levels only, there could potentially be a sufficient number of electricians to meet the project peak workforce needs, enough pipefitters to meet over 25% of the project needs, and enough iron workers to meet over 50% of the project needs. However, the data provided represents only a rough approximation of current employment trends among unionized construction workers affiliated with the union locals contacted, and is not necessarily representative of the population of electricians, pipefitters, iron workers and other skilled construction labor that is found within the 50-mile area, qualified to work on the project, and unemployed or otherwise available to work on the project.

Table 7: Electrician, Pipefitter, and Iron Worker Union Membership and Unemployment Levels, August 2009 (Page 1 of 2)

Electricians and Line Workers, International Brotherhood of Electrical Workers			
Local Number	**Total Number of Members**	**Unemployed**	**Notes**
#1319 Linemen	250	35 journey linemen 15 apprentice linemen 12 equipment operations/ groundmen/other	These numbers are for Book 1, or the people that live in the area (this Union includes 32 counties, or the northern ½ of Pennsylvania). Book 2 workers reside outside of the area, but they call the union looking for work. The representative estimated that there are approximately 100 Journey/Linemen on the Book 2 unemployed list.
#163 Electricians	425	65 journeymen 7 apprentices	250 people are on Book 2. This union includes all or parts of Luzerne, Lackawanna, Monroe, Bradford, Wyoming, and Columbia counties.
#81 Electricians			Unable to reach the contact provided.

Table 7: Electrician, Pipefitter, and Iron Worker Union Membership and Unemployment Levels, August 2009 (Page 2 of 2)

Electricians and Line Workers, International Brotherhood of Electrical Workers (continued)			
Local Number	**Total Number of Members**	**Unemployed**	**Notes**
#375 Electricians	700	200 journey men 20 apprentices	This union includes parts or all of Carbon, Lehigh, Northampton, Bucks, Montgomery, and Berks counties.
#812 Electricians	108	53 journey men 5 apprentices	This union includes all or part of Potter, Clinton, Union, Sullivan, Center, Tioga, and Lycoming counties.
#126 Linemen	1,900	250 journey men 350 apprentices	This union includes 37 counties in southern Pennsylvania.
Pipefitters and Plumbers Local Union			
Local Number	**Total Number of Members**	**Unemployed**	**Notes**
#524	600	120	This union does not separate information about unemployment into job classes. No other pipefitter unions are located in the area; the closest one is in Harrisburg. This union includes all or parts of Luzerne, Wyoming, Susquehanna, Wayne, Pike, Monroe, Carbon, Bradford, Columbia, Sullivan, Schuylkill, and Lackawanna counties.
Iron Workers Local Union			
Local Number	**Total Number of Members**	**Unemployed**	**Notes**
#489	385	110	No job classification breakdown of unemployment was provided. This union includes 11 counties in northeastern Pennsylvania, bordering New York and New Jersey.
#420	130	65	This union includes all or parts of Berks, Schuylkill, Carbon, Lehigh, Lebanon, Lancaster, Northampton, Chester, and Montgomery counties.
#36	200	67	This union includes Carbon, Monroe, Lehigh, Bucks, Northampton, Warren, and Hunterdon counties.

References Cited in Response:

CWIA, 2009. Center for Workforce Information and Analysis, Analyzer 2.2, Labor Market Information. Website accessed on September 4, 2009, http://www.paworkstats.state.pa.us/analyzer/.

PDLS, 2009a. Pennsylvania Department of Labor and Statistics, Employment and Unemployment Estimates for Metropolitan and Micropolitan Statistical Areas (MSAs), Allentown/Bethlehem MSA. Website accessed on September 4, 2009, from http://www.dli.state.pa.us/landi/lib/landi/cwia/releases/abemesa_pr.pdf.

PDLS, 2009b. Pennsylvania Department of Labor and Statistics, Employment and Unemployment Estimates for Metropolitan and Micropolitan Statistical Areas (MSAs), Scranton/Wilkes-Barre MSA. Website accessed on September 4, 2009, from http://www.dli.state.pa.us/landi/lib/landi/cwia/releases/scwbmesa_pr.pdf.

PDLS, 2009c. Pennsylvania Department of Labor and Statistics, Employment and Unemployment Estimates for Metropolitan and Micropolitan Statistical Areas (MSAs), Bloomsburg/Berwick MSA. Website accessed on September 4, 2009, from http://www.dli.state.pa.us/landi/lib/landi/cwia/releases/blooms-bermisa_pr.pdf.

USCB, 2000. United States Census Bureau, American Fact Finder, Census 2000 Summary File 3, Occupation by Sex. Website accessed on September 10, 2009, http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_submenuId=datasets_2&_lang=en&_ts=.

USCB, 2006. United States Census Bureau, American Fact Finder, 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, 2008. United States Census Bureau, American Fact Finder, American Community Survey 2005-2007, Website accessed on September 4, 2009, http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuId=&_lang=en&_ts=)

COLA Impact:
The BBNPP ER will be revised as follows in a future revision of the COLA:

2.5.2.1.1 50 Mi (80 km) Geographic Area of Comparison

Table 2.5-11 (USCB, 2000a) (USCB, 2000b) (USCB, 2000c) (USCB, 2000d) (USCB, 2000e) (USCB, 2006a) (USCB, 2006b) (USCB, 2006c) (USCB, 2006d) displays data in 2000 and 2006 about: the population 16 years old and older; the individuals in the labor force, which consists of the total civilian labor force and the armed forces; and the number of individuals not in the labor force for the U.S., the Commonwealth of Pennsylvania, the Scranton-Wilkes-Barre-Hazleton MSA, Luzerne County, and Columbia County. The table also presents the total civilian labor force as the number of employed civilians, the number of unemployed civilians, and the rate of unemployment. The Scranton-Wilkes-Barre-Hazleton MSA consisted of Columbia, Lackawanna, Luzerne, and Wyoming counties. Columbia County was originally part of the MSA in 2000; however based on the latest information available on the MSA boundaries, Columbia County is no longer part of the Scranton-Wilkes-Barre-Hazleton MSA but is now part of an adjacent micropolitan area. Therefore, comparisons between 2000 and 2006 cannot be made. The Scranton-Wilkes-Barre-Hazleton MSA had a total civilian labor force of 299,308 in 2000, of which 16,732 (5.6%) were unemployed. In comparison, the Commonwealth of Pennsylvania

had a 2000 unemployment rate of 5.7% and in 2006 it was 6.2%. Also, the U.S. had an unemployment rate of 5.8% in 2000 and 6.4% in 2006. From 2000 to 2006, the total civilian labor force in the Commonwealth of Pennsylvania experienced an average annual increase of approximately 0.8%.

The Scranton-Wilkes-Barre-Hazleton MSA could provide construction, operations, and maintenance workers for the proposed BBNPP facility. According to the Bureau of Labor Statistics, the Scranton-Wilkes-Barre-Hazleton MSA had 9,000 people employed in the construction and extraction job industry in May 2006. These workers earned mean salaries of $18.72 per hour and $38,940 per year (BLS, 2008).

The potential availability of construction workers by job class within the 50 mile area was determined based on information obtained from the US Census Bureau industry and sector group database (USCB, 2006m) and discussions with local union representatives. Table 2.5-12a demonstrates that within the 50 mile radius of BBNPP, at least 49,179 paid employees were in the construction industry in 2006. Of this amount, 12,735 were involved in the construction of buildings, 4,404 were involved in heavy and civil engineering construction, and 31,347 were involved in specialty trade construction. Local unions in the 50-mile area representing construction trades were contacted to obtain information on the size and availability of the local workforce. Among the unions that provided data in August 2009, there were 4,698 members, 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.

2.5.2.1.2 Two-County Region of Influence

As presented in Table 2.5-12b (USCB, 2000a) (USCB, 2000b) (USCB, 2006a) (USCB, 2006b), the top five industry sectors in the ROI in 2006 include educational, health, and social services (23.8%); manufacturing (14.4%); retail trade (13.9%); arts, entertainment, recreation, accommodation, and food services (8.0%); and professional, scientific, management, administrative, and waste services (7.2%).

2.5.4.6 References

USCB, 2006m. 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.

Table 2.5-12a County Employment for the 50-mile Area by Economic Sector, Sub-Sector, Industry Group, and Industry: Construction, 2006

(Page 1 of 3)

County	Construction (23)	Construction of Buildings (236)	Industrial Building Construction (23621)	Heavy and Civil Engineering Construction (237)	Highway, Street, and Bridge Construction (2373)	Specialty Trade Contractors (238)	Building Foundation and Exterior Contractors (2381)	Poured Concrete Structure Contractors (23811)
Berks	7,385	1,520	62	508	249	5,357	1,082	198
Bradford	463	172		9	a	282	83	30
Carbon	565	c		b	a	348	92	20
Columbia	1,027	273	a	229	75	525	183	4
Dauphin	6,041	2,031	c	304	120	3,706	657	83
Lackawanna	2,784	890	28	149	a	1,745	430	55
Lebanon	1,910	427	21	125	b	1,358	171	4
Lehigh	7,022	1,815	246	360	152	4,847	1,028	299
Luzerne	5,348	1,624	b	677	260	3,047	503	100
Lycoming	2,085	436		464	290	1,185	215	85
Monroe	2,683	918	a	136	102	1,629	403	78
Montour	138	66		20	a	52	b	a
Northampton	5,175	950		662	311	3,563	1,098	258
Northumberland	1,048	440		33	a	575	184	82
Pike	478	183		49	a	246	32	a
Schuylkill	1,679	532	20	262	110	885	321	17
Snyder	622	168	a	25	25	429	b	a
Sullivan	78	b				b		
Susquehanna	322	b		a	a	232	85	2
Union	671	c	a	a	a	502	95	a
Wayne	1,352	290		392	b	670	124	a
Wyoming	303	c		a		164	b	a
Totals*	**49,179**	**12,735**	**377**	**4,404**	**1,694**	**31,347**	**6,786**	**1,315**

Table 2.5-12a County Employment for the 50-mile Area by Economic Sector, Sub-Sector, Industry Group, and Industry: Construction, 2006

(Page 2 of 3)

County	Steel and Precast Concrete Contractors (23812)	Masonry Contractors (23814)	Building Equipment Contractors (2382)	Electrical Contractors (23821)	Plumbing and HVAC Contractors (23822)	Drywall and Insulation Contractors (23831)	Painting and Wall Covering Contractors (23832)	Finish Carpentry Contractors (23835)	Site Preparation Contractors (23891)
Berks	b	401	2,315	830	1,283	201	207	157	831
Bradford		a	91	14	77	a		a	49
Carbon	a	21	133	71	b		18	15	55
Columbia	a	142	165	26	139	20	15	30	85
Dauphin	a	159	1,719	562	971	548	168	78	223
Lackawanna	b	129	892	412	450	34	15	80	107
Lebanon		65	715	365	e	117	32	97	133
Lehigh	b	248	2,614	1,037	1,418	153	250	189	250
Luzerne		106	1,524	516	945	137	303	145	327
Lycoming	a	19	723	181	433	40	24	18	118
Monroe	b	100	855	488	e	20	41	44	181
Montour		a	b	a	17	a			A
Northampton	225	272	989	252	676	511	170	115	518
Northumberland		42	197	b	108	a	4	b	61
Pike		13	113	b	58	a	7	12	62
Schuylkill	c	a	267	139	128	78	15	17	116
Snyder		a	127	27	100	a	a	a	B
Sullivan			a	a	a		a		A
Susquehanna	a	b	41	30	11	a		a	48
Union		42	173	a	152	a	14	a	169
Wayne	b	39	199	b	110	a	23	26	262
Wyoming		14	74	44	b	a	a	a	56
Totals*	**225**	**1,812**	**13,926**	**4,994**	**7,076**	**1,859**	**1,306**	**1,023**	**3,651**

Table 2.5-12a County Employment for the 50-mile Area by Economic Sector, Sub-Sector, Industry Group, and Industry: Construction, 2006

(Page 3 of 3)

Source: USCB, 2006m.
Notes:

a = 0 to 19 employees
b = 20 to 99 employees
c = 100 to 249 employees
d = is not used by the USCB in this table
e = 250 to 499 employees
* Totals do not include counties characterized by employment ranges a-e as noted above

Table 2.5-12b Employment by Industry Sectors and Class of Workers in Luzerne County, Columbia County, and the ROI, 2000 and 2006 (Page 1 of 2)

Industry Sector and Class of Workers	Average Employment											
	Luzerne County				Columbia County				Total ROI			
	2000		2006		2000		2006		2000		2006	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total, All Industries	143,492	100%	147,674	100%	30,006	100%	31,398	100%	173,498	100%	179,072	100%
Agriculture, Forestry, Fishing & Hunting, and Mining	1,057	0.7%	974	0.7%	561	1.9%	450	1.4%	1,618	0.9%	1,424	0.8%
Construction	8,515	5.9%	8,164	5.5%	1,624	5.4%	2,134	6.8%	10,139	5.8%	10,298	5.8%
Manufacturing	23,754	16.6%	19,685	13.3%	7,233	24.1%	6,163	19.6%	30,987	17.9%	25,848	14.4%
Wholesale Trade	6,075	4.2%	6,369	4.3%	790	2.6%	643	2.0%	6,865	4.0%	7,012	3.9%
Retail Trade	18,595	13.0%	21,399	14.5%	3,609	12.0%	3,567	11.4%	22,204	12.8%	24,966	13.9%
Transportation and Warehousing, Utilities	8,260	5.8%	7,269	4.9%	1,571	5.2%	1,611	5.1%	9,831	5.7%	8,880	5.0%
Information	4,916	3.4%	4,816	3.3%	513	1.7%	813	2.6%	5,429	3.1%	5,629	3.1%
Finance, Insurance, Real Estate and Rental and Leasing	8,322	5.8%	8,808	6.0%	969	3.2%	926	2.9%	9,291	5.4%	9,734	5.4%
Professional, Scientific, Management, Administrative, and Waste Services	8,963	6.2%	11,238	7.6%	1,438	4.8%	1,734	5.5%	10,401	6.0%	12,972	7.2%
Educational, Health, and Social Services	30,882	21.5%	33,791	22.9%	7,170	23.9%	8,852	28.2%	38,052	21.9%	42,643	23.8%
Arts, Entertainment, Recreation, Accommodation and Food Services	9,988	7.0%	11,601	7.9%	2,355	7.8%	2,660	8.5%	12,343	7.1%	14,261	8.0%
Other Services (except public administration)	6,369	4.4%	5,971	4.0%	1,185	3.9%	1,166	3.7%	7,554	4.4%	7,137	4.0%
Public Administration	7,796	5.4%	7,589	5.1%	988	3.3%	679	2.2%	8,784	5.1%	8,268	4.6%

Table 2.5-12b Employment by Industry Sectors and Class of Workers in Luzerne County, Columbia County, and the ROI, 2000 and 2006 (Page 2 of 2)

Industry Sector and Class of Workers	Average Employment											
	Luzerne County				Columbia County				Total ROI			
	2000		2006		2000		2006		2000		2006	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Class of Workers												
Private wage and salary workers	117,667	82.0%	120,502	81.6%	24,104	80.3%	25,491	81.2%	141,771	81.7%	145,993	81.5%
Government Workers	17,307	12.1%	17,891	12.1%	3,775	12.6%	3,981	12.7%	21,082	12.2%	21,872	12.2%
Self-employed workers in own not incorporated business	8,131	5.7%	8,917	6.0%	2,002	6.7%	1,902	6.1%	10,133	5.8%	10,819	6.0%
Unpaid family workers	387	0.3%	364	0.2%	125	0.4%	24	0.1%	512	0.3%	388	0.2%
Totals	**143,492**	**100%**	**147,674**	**100%**	**30,006**	**100%**	**31,398**	**100%**	**173,498**	**100%**	**179,072**	**100%**

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...

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 2.5-12a, 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.

4.4.2.10 References

USCB, 2006e. 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.

SE 2.5-4

ESRP 2.5.2

Summary: *Provide clarification of how the various jurisdictions interact in the area (e.g., boroughs, townships, etc.).*

Full Text: Identify and describe the political structure of each jurisdiction (e.g., boroughs, townships) with decision making responsibility on issues affecting BBNPP construction and operation. Detail responsibilities by jurisdiction governing permitting, land use, tax and other relevant matters relating to the construction and operation of the BBNPP, and, to the extent feasible, discuss the nature of the interactions these competing jurisdictions must have while addressing these issues.

Response: Local political entities that have jurisdiction over various aspects of the permitting, construction and operation of BBNPP include Salem Township and Luzerne County, where the project is physically located, and to some extent the adjacent Borough of Berwick and Columbia County. The responsibilities and organization of these local entities are described in general below.

General Political Structure

The Commonwealth of Pennsylvania has 67 counties. Traditionally, counties perform state-mandated duties. These duties can include property assessments, record keeping for property and vital statistics, maintenance of rural roadways, administration of election and judicial functions, and relief for the poor (NACO, 2005).

Municipal governing bodies make policy decisions, levy taxes, borrow money, authorize expenditures, and direct administration of their governments by their appointees. While cities may have more specific enumerated powers than boroughs or townships, many of those powers also may be exercised by boroughs and townships under general grants of power (Pennsylvania, n.d.).

Municipal areas of local services often include police and fire protection, maintenance of local roads and streets, water supply, sewage collection and treatment, parking and traffic control, local planning and zoning, parks and recreation, garbage collection, health services, libraries, licensing of businesses, and code enforcement (Pennsylvania, n.d.).

Within Pennsylvania, two types of townships are present, first class and second class. A first class township has a governing body comprised of elected commissioners, while a second class township has a board of three supervisors who are elected at-large (Pennsylvania, n.d.). Salem Township is a second class township

The Salem Township Board of Supervisors also serves as the legislative body. For this reason, they set policy, enact ordinances and resolutions, adopt budgets, and levy taxes. As part of the township governance, services also can be provided and can include water, sewer, refuse collection, code enforcement, recreation, and land use planning and regulation (Middletown Township, 2009).

Typically, the lowest level of governance for which a code/permit/regulation is present is applied. If this is not available at the township level, the county ordinances and requirements usually apply.

Land Use and Zoning

An interview was conducted with the zoning officer of Salem Township on August 4, 2009. The zoning officer reviewed the process about the regulatory authority for the BBNPP. The zoning officer for Salem Township stated that the BBNPP is located entirely within Luzerne County and Salem Township. The Zoning Officer is initially responsible for reviewing the development's compliance with existing zoning ordinances. The zoning hearing board will review the plans if variance or other use approval is required. The Planning Commission and Board of Supervisors are responsible for land development plan review, with the Board of Supervisors having the ultimate authority to approve land development plans. In both of these processes, the Luzerne County Planning Commission has review authority and can provide input to the Township. Comments provided by the county must be considered by the township when evaluating the final zoning and land development plans. No state involvement is required for zoning and land use.

Construction Permits and Approvals

As discussed in Section 1.3.3 of the ER, plans for construction and operation of the proposed BBNPP are being communicated to and coordinated with local organizations, in particular the Luzerne County Planning Commission and the County Engineer. The Salem Township Zoning Ordinance under Section 1302 (SALEM, 2004b) requires site development plans (SALEM, 2001b), erosion and sediment control plans, and related site access plan (SALEM, 2001a) approvals be obtained from Luzerne County, PennDOT and the PADEP prior to Salem Township approval. In addition, permits for demolition and/or relocation of the existing site structures will be accomplished under a permit from Salem Township Building Code (SALEM, 2004c). Once these approvals are issued for the project, a construction permit will be issued by Salem Township to begin site preparation work and construction of roads, offices buildings, and warehouses. ER Table 1.3-1 lists the various permits and interactions with each of the jurisdictions including Salem Township and Luzerne and Columbia counties.

Taxes and Fees

Taxes and fees within the state, county and local jurisdictions are discussed in ER Section 2.5.2.7. The Commonwealth of Pennsylvania imposes income and sales taxes whereas the counties rely on property tax and hotel tax. Luzerne County values properties located within the County and levies tax on properties that was approximately 94.9 mills on properties in 2008. Columbia County levies a real estate tax of about 6.146 mills and a Sinking Fund of 1.345 mills or a combined millage of about 7.49 mills. The Berwick Area School District and Salem Township also levy tax on properties located within their respective jurisdictions. They are 9.9 mills and 0.224 mills respectively. In addition the borough of Berwick imposes taxes for the general fund, fire protection and street lighting.

Water and Sewer

Water supply and waste water treatment are discussed in ER Section 2.5.2.9.2. Individual water supplies and treatment facilities are listed in Tables 2.5-28-30. With respect to BBNPP, a local permit to tie into the municipal sewer system will be required (SALEM, 2001c) (PA, 2008d). Berwick Area Joint Sewer Authority & Pennsylvania American Water Co. will serve BBNPP.

Traffic Mitigation and Highway Access

With respect to traffic improvements, road occupancy permits may be required and the Luzerne County Engineer and local township engineer will be provided the necessary information. In addition, a highway occupancy permit using Pennsylvania Department of Transportation (PennDOT) regulations will be issued by PennDOT for construction of the new site access road to the state highway (PA CODE, 2008w).

PPL Bell Bend, LLC has consulted with the Luzerne County Engineer along with the Borough of Berwick and Columbia County and PennDOT to ensure the Traffic Impact Study and road access plans will meet PennDOT, Salem Township, Berwick and County criteria.

References Cited in Response:

Middletown Township, 2009. How Township Government Works. Website accessed on July 31, 2009, http://www.middletowntwpbucks.org/information/government.aspx.

NACO, 2005: National Association of Counties (NACO), 2005. An Overview of County Government. Website accessed on July 31, 2009, http://www.naco.org/Content/NavigationMenu/About_Counties/County_Government/A_Brief_Overview_of_County_Government.htm.

PA, 2008d. Pennsylvannia Public Act 537, Sewage Facilities, 1966.

PA CODE, 2008w. Title 67, Pennsylvania Code, Chapter 441, Access to and Occupancy of Highways by Driveways and Local Roads, 2008.

Pennsylvania, n.d.: Commonwealth of Pennsylvania, n.d. Pennsylvania Local Government. Volume 116. Section 6. Website accessed on July 31, 2009, http://www.portal.state.pa.us/portal/server.pt/gateway/PTARGS_0_71264_0_0_18/.

SALEM, 2001a. Salem Township Subdivision and Land Development Ordinance, Section 800, Application, 2001.

SALEM, 2001b. Salem Township Subdivision and Land Development Ordinance, Section 501,Submission and Review Procedure, 2001.

SALEM, 2004b. Salem Township Zoning Ordinance, Section 1302, Zoning Permit, 2004.

SALEM, 2004c. Salem Township Zoning Ordinance, Section 1303, Certificate of Zoning Compliance, 2004.

COLA Impact:
No changes to the BBNPP COLA ER are required as a result of this RAI response.

SE 2.5-7

ESRP 2.5.2

Summary : *Provide a detailed analysis of the capacity of local public schools in the project vicinity, including identifying the schools in the geographic area expecting to receive the greatest population impact from the project. In this analysis, compare the capacity of the local school districts to student enrollment to determine capacity utilization or percentage of use. Also include a comparison of current student to teacher ratios to statewide limits.*

Full Text: The discussion of school districts is aggregated in the ROI. Provide a more detailed analysis to address local school district capacity and utilization, particularly the Berwick Area School District.

Response: Capacity of local schools in the project vicinity was addressed by comparing capacity to student enrollment and by evaluating student to teacher ratios relative to statewide standards.

The local public school district most likely affected by the in-migration of families stemming from the construction and operation of the Bell Bend Nuclear Power Plant is the Berwick Area School District. Other nearby districts potentially affected include the communities of Bloomsburg, Nanticoke, and Shickshinny. Larger regional districts located further from the proposed plant site include Hazleton and Wilkes-Barre.

Capacity and Student Enrollment

Berwick Area School District (Luzerne and Columbia Counties)

The Berwick Area School District includes the boroughs of Berwick, Briar Creek, and Nescopeck and the townships of Salem, Briar Creek, Nescopeck, and Hollenback. It encompasses most of the populated areas within the immediate vicinity of BBNPP. The following information for Berwick was derived from discussions with the Berwick Area School District superintendent. The current enrollments for the 2008-2009 school year and the capacities within the buildings for the Berwick Area School District are as follows:

School	Capacity	Enrollment (2008/2009)	% Capacity
Berwick High School	1,405	924	65.8%
Berwick Middle School	1,225	845	69.0%
Fourteenth St. Elementary	300	230	76.7%
Orange Street	500	374	74.8%
Nescopeck Elementary	387	281	74.3%
Salem Elementary	475	458	96.5%
Mulberry St. Elementary	No data		

While there appeared to be adequate capacity, the Superintendent was concerned about the age and condition of the schools.

Interviews with the Berwick Area School District, conducted in July and August 2008, suggested that any new in-migration due to the construction or operation phase would result in the need for additional classroom space, teaching staff, supplies, and materials.

Hazleton Area School District (Luzerne County)

The Hazleton Area School District is located to the South and East of the Berwick Area School District and includes most of the communities in Southern Luzerne County near Hazleton. The existing enrollment and capacity information for the Hazleton Area School District are as follows based on a web search:

School	Capacity	Enrollment (2007/2008)	% Capacity
Arthur School	350	519	148%
McAdoo/Kelayres	450	419	93%
Drums	689	813	118%
Heights Terrace	1,071	1,055	98%
Valley	1,047	1,176	112%
West Hazleton	789	909	115%
Freeland	961	872	91%
The Castle	1,039	1,030	99%
Hazle Building	725	939	129%
High School	1,637	2,287	140%

Source: Highland Associates, 2007

The above numbers for enrollments within the Hazleton Area School District vary from those presented in ER Table 2.5.2-20, because they are based on enrollment projections for the 2007-2008 school year. The data suggest that the school systems in Hazelton are at or substantially above capacity.

Greater Nanticoke Area SD (Luzerne)

The Greater Nanticoke Area School District is located to the East and Northeast of the Berwick Area School District and borders the Susquehanna River. The Director of Buildings and Grounds provided information on the district school enrollment and capacity. He was not able to provide individual building capacity, but stated that all schools were operating at capacity. The following table provides a summary of this information:

School	Enrollment (as of June 2009)	% Capacity
GNA Elementary School	513	100%
Greater Nanticoke Area Education Center	334	
Greater Nanticoke Area High School	927	
J.F. Kennedy Elementary School	164	
K.M. Smith Elementary School	396	

Crestwood SD (Luzerne)

The Crestwood School District is located to the East of the Berwick Area School District and to the North of the Hazleton Area School District. The superintendent of the Crestwood School District provided the following information on the capacity of the schools within the district:

School	Capacity	Enrollment (2008-2009)	% Capacity
Crestwood High School	1,424	1,601	112%
Crestwood Middle School			
Fairview Elementary School	1,600	1,543	96%
Rice Elementary School			

Note that information was provided for the high school and middle school combined, and for the two elementary schools combined.

Wilkes-Barre SD (Luzerne)

Information provided by a representative of the Wilkes-Barre School District included the following:

School	Capacity	Enrollment (2008-2009)	% Capacity
Elementary Schools	Not Available	3,420	Not Available
High School	Not Available	3,059	Not Available

Other Districts

Attempts were made to contact the Bloomsburg Area School District, the Central Columbia School District, the Hanover School District, and the Wyoming Valley West School District, but no additional data was made available prior to submittal of this response.

The capacity of nearby school districts, other than Berwick, was evaluated based on student to teacher ratios.

Student to Teacher Ratios

Student/teacher ratios for the 2005-2006 school year are provided in Tables 2.5-20 and 2.5-21 of the Bell Bend Environmental Report (ER) and are discussed in ER Section 2.5.2.5. These ratios provide information relative to student classroom capacity and state academic standards.

According to the Pennsylvania Code for Academic Standards, pre-kindergarten programs must have a student-teacher ratio of no more than 20 students for one teacher and one teacher aide in a classroom (i.e., 2 adults in a classroom for every 20 students). Programs of high quality ordinarily have a student-teacher ratio of 17 students for one teacher and one teacher aide in a classroom (i.e., 2 adults for every 17 students). Programs operating under contract with community providers must comply with staffing qualifications as required by 22 Pa Code § 49.85(c) (relating to limitations) (PA Code, 2009).

The state code did not contain information regarding any other levels of education. However, NCES (2009) indicated that the Pennsylvania state student-teacher ratio averaged 15.2 students per full time equivalent (FTE) teacher during the 2006-2007 school year. The national average student-teacher ratio was 15.5 students per FTE teacher during that same period.

The student-teacher ratios in Berwick during the 2005-2006 school year ranged between 13.3 and 15.9, and all but one of the 7 schools listed were below the state average (when compared to the 2006-2007 state average) (NCES, 2008). Ratios within the Bloomsburg School system were below the state average during the 2005-2006 school year. Student-teacher ratios at schools within the Nanticoke and Northwest Area (Shickshinny) School systems generally exceeded the state average. Ratios at private schools were highly variable.

The table shown below, which is based on ER Table 2.5-20, provides a summary of the student to teacher ratios within the public school districts within the two counties (NCES, 2008). It also provides a comparison to the state ratio of 15.2 students per full time equivalent teacher (NCES, 2009).

County/Public School District/Schools	City/Location	Grades Taught	Number of Students	Students per FTE Teacher	Greater than State Average 15.2	Percent Decrease in School Ratio Needed to Meet the State Ratio of 15.2
Luzerne County						
Bear Creek Community CS:						
Bear Creek Community Charter School	Wilkes-Barre	K-7	259	15.6	Yes	2.56
Crestwood SD:						
Crestwood High School	Mountain Top	9-12	1,104	21.4	Yes	28.97
Crestwood Middle School	Mountain Top	7-8	495	17.2	Yes	11.63
Fairview Elementary School	Mountain Top	K-6	773	19.1	Yes	20.42
Rice Elementary School	Mountain Top	K-6	790	17.9	Yes	15.08
Dallas SD:						
Dallas Elementary School	Dallas	K-5	697	18	Yes	15.56
Dallas High School	Dallas	9-12	869	16.6	Yes	8.43
Dallas Middle School	Dallas	6-8	684	17.5	Yes	13.14
Wycallis Elementary School	Dallas	K-5	450	21.2	Yes	28.30
Greater Nanticoke Area SD:						
GNA Elementary School	Nanticoke	3-5	443	16.5	Yes	7.88
Greater Nanticoke Area Education Center	Nanticoke	6-7	324	18.3	Yes	16.94

County/Public School District/Schools	City/Location	Grades Taught	Number of Students	Students per FTE Teacher	Greater than State Average 15.2	Percent Decrease in School Ratio Needed to Meet the State Ratio of 15.2
Greater Nanticoke Area High School	Nanticoke	8-12	953	20.7	Yes	26.57
J.F. Kennedy Elementary School	Nanticoke	2	132	20.6	Yes	26.21
K.M. Smith Elementary School	Nanticoke	K-1	322	20.5	Yes	25.85
Hanover Areas SD:						
Hanover Area Junior/Senior High School	Wilkes-Barre	7-12	1,044	17.4	Yes	12.64
Hanover Area Memorial Elementary School	Wilkes-Barre	5-6	291	13.3	No	n/a
Hanover Green Elementary School	Wilkes-Barre	K	134	13.5	No	n/a
Lee Park Elementary School	Wilkes-Barre	1-2	291	21.7	Yes	29.95
Lyndwood Elementary School	Wilkes-Barre	3-4	300	16.5	Yes	7.88
Hazleton Area SD:						
Arthur Street Elementary School	Hazleton	K-6	432	17.8	Yes	14.61
Drums Elementary/Middle School	Drums	K-8	731	19.2	Yes	20.83
Freeland Elementary/Middle School	Freeland	K-8	956	17.2	Yes	11.63

County/Public School District/Schools	City/Location	Grades Taught	Number of Students	Students per FTE Teacher	Greater than State Average 15.2	Percent Decrease in School Ratio Needed to Meet the State Ratio of 15.2
Hazle Elementary School	Hazleton	K-6	752	17.2	Yes	11.63
Hazleton Area High School	Hazleton	9-12	3,335	20.3	Yes	25.12
Heights Terrace Elementary/Middle School	Hazleton	K-8	1,072	18.1	Yes	16.02
McAdoo Kelayres Elementary School	McAdoo	K-6	426	15.3	Yes	0.65
Valley Elementary/Middle School	Sugarloaf	K-8	1,109	16.7	Yes	8.98
West Hazleton Elementary/Middle School	West Hazleton	K-8	973	17.6	Yes	13.64
Hazleton Areas Carrer Center SD:						
Hazleton Area Career Center	Hazleton	9-12	n/a	n/a	n/a	n/a
Lake-Lehman SD:						
Lake-Lehman Junior High School	Lehman	7-12	1,071	16.7	Yes	8.98
Lake-Noxen Elementary School	Harveys Lake	K-6	353	13	No	n/a
Lehman-Jackson Elementary School	Lehman	K-6	486	14	No	n/a
Ross Elementary School	Sweet Valley	K-6	248	13.9	No	n/a

County/Public School District/Schools	City/Location	Grades Taught	Number of Students	Students per FTE Teacher	Greater than State Average 15.2	Percent Decrease in School Ratio Needed to Meet the State Ratio of 15.2
Luzerne IU 18 SD:						
Luzerne Intermediate Unit 18	Kingston	n/a	n/a	n/a	n/a	n/a
Northwest Areas SD:						
Garrison Memorial School	Shickshinny	K-6	160	13.1	No	n/a
Hunlock Creek School	Shickshinny	K-6	284	15.6	Yes	2.56
Huntington Mills School	Shickshinny	K-6	308	17.5	Yes	13.14
Northwest Area High School	Shickshinny	7-12	668	15.2	No	n/a
Pittston Area SD:						
Ben Franklin Kindergarten Center	Dupont	K	199	19.9	Yes	23.62
Pittston Area High School	Pittston	9-12	1,079	20.2	Yes	24.75
Pittston Area Middle School	Pittston	6-8	760	16.5	Yes	7.88
Pittston Area Primary Center	Pittston	1-2	454	15.1	No	n/a
Pittston City Intermediate Center	Pittston	3-5	688	18.1	Yes	16.02
West Side AVTS:						
West Side AVTS School	Kingston	9-12	503	13.6	No	n/a

County/Public School District/Schools	City/Location	Grades Taught	Number of Students	Students per FTE Teacher	Greater than State Average 15.2	Percent Decrease in School Ratio Needed to Meet the State Ratio of 15.2
Wilkes-Barre Areas SD:						
Daniel J. Flood Elementary School	Wilkes-Barre	K-6	521	14.6	No	n/a
Dodson Elementary School	Wilkes-Barre	K-6	457	17.1	Yes	11.11
Dr. David W. Kistler Elementary School	Wilkes-Barre	K-6	903	16.8	Yes	9.52
Elmer L. Meyers Junior/Senior High School	Wilkes-Barre	7-12	949	14	No	n/a
G.A.R. Memorial Junior/Senior High School	Wilkes-Barre	7-12	919	14.8	No	n/a
Heights/Murray Elementary School	Wilkes-Barre	K-6	653	14.1	No	n/a
James M. Coughlin Junior/Senior High School	Wilkes-Barre	9-12	1,075	16.9	Yes	10.06
Solomon/Plains Elementary School	Plains	K-6	858	15.8	Yes	3.80
Solomon/Plains Junior High School	Plains	7-8	535	15.2	No	n/a
Wilkes-Barre AVTS:						
Wilkes-Barre AVTS School	Wilkes-Barre	9-12	n/a	n/a	n/a	n/a
Wyoming Area SD:						

County/Public School District/Schools	City/Location	Grades Taught	Number of Students	Students per FTE Teacher	Greater than State Average 15.2	Percent Decrease in School Ratio Needed to Meet the State Ratio of 15.2
Kennedy Elementary Center	Exeter	K-4	246	18.1	Yes	16.02
Montgomery Avenue Elementary School	West Pittson	K-6	475	16.8	Yes	9.52
Sara J. Dymond Elementary School	Pittston	K-6	231	13.9	No	n/a
Tenth Street Elementary School	Wyoming	K-5	359	16.1	Yes	5.59
Wyoming Area Secondary Center	Exeter	7-12	1,316	18.6	Yes	18.28
Wyoming Valley West SD:						
Chester Street Elementary School	Kingston	1-5	232	13.6	No	n/a
Dana Elementary Center	Forty Fort	K-5	553	16.3	Yes	6.75
Main Elementary Center	Plymouth	K-5	401	14.3	No	n/a
Pringle Street Elementary School	Kingston	K-4	96	12	No	n/a
Schuyler Avenue Elementary School	Kingston	K-5	241	17.2	Yes	11.63
State Elementary Center	Larksville	K-5	594	16.3	Yes	6.75
Third Avenue Elementary School	Kingston	K-5	163	27.2	Yes	44.12
Wyoming Valley West Middle School	Kingston	6-8	1,315	17.5	Yes	13.14

County/Public School District/Schools	City/Location	Grades Taught	Number of Students	Students per FTE Teacher	Greater than State Average 15.2	Percent Decrease in School Ratio Needed to Meet the State Ratio of 15.2
Wyoming Valley West High School	Plymouth	9-12	1,485	18.3	Yes	16.94
Other:						
Youth Forestry Camp #2 School	White Haven	6-12	49	6.1	No	n/a
Subtotals	**69**		**42,028**			
Columbia County						
Benton Area SD:						
Appleman Elementary School	Benton	K-6	385	12.6	No	n/a
Benton Area Junior/Senior High School	Benton	7-12	382	12.7	No	n/a
Berwick Area SD:						
Berwick Area High School	Berwick	9-12	992	13.5	No	n/a
Berwick Area Middle School	Berwick	608	897	14.7	No	n/a
Fourteenth Street Elementary School	Berwick	K-5	214	13.8	No	n/a
Mulberry Street Elementary School	Berwick	K-5	88	10.9	No	n/a
Nescopeck Elementary School	Nescopeck	K-5	276	14.5	No	n/a

County/Public School District/Schools	City/Location	Grades Taught	Number of Students	Students per FTE Teacher	Greater than State Average 15.2	Percent Decrease in School Ratio Needed to Meet the State Ratio of 15.2
Orange Street Elementary School	Berwick	K-5	386	13.3	No	n/a
Salem Elementary School	Berwick	K-5	462	15.9	Yes	4.40
Bloomsburg Area SD:						
Beaver-Main Elementary School	Bloomsburg	K-5	104	14.1	No	n/a
Bloomsburg Area High School	Bloomsburg	9-12	488	13.5	No	n/a
Bloomsburg Area Middle School	Bloomsburg	6-8	440	13.1	No	n/a
Memorial Elementary School	Bloomsburg	K-5	454	13.5	No	n/a
W.W. Evans Memorial Elementary School	Bloomsburg	K-5	263	14.6	No	n/a
Central Columbia SD:						
Central Columbia Elementary School	Bloomsburg	K-4	712	15.4	Yes	1.30
Central Columbia High School	Bloomsburg	9-12	696	15.4	Yes	1.30
Central Columbia Middle School	Bloomsburg	5-8	713	16.4	Yes	7.32
Columbia Montour AVTS SD:						
Columbia-Montour AVTS School	Bloomsburg	9-12	682	16	Yes	5.00
Millville Area SD:						

County/Public School District/Schools	City/Location	Grades Taught	Number of Students	Students per FTE Teacher	Greater than State Average 15.2	Percent Decrease in School Ratio Needed to Meet the State Ratio of 15.2
Millville Area Elementary School	Millville	K-6	411	11.7	No	n/a
Millville Area Junior/Senior High School	Millville	6-12	344	11.1	No	n/a
South Columbia Area SD:						
Hartman Elementary Center	Catawissa	K-4	536	14.4	No	n/a
Southern Columbia High School	Catawissa	9-12	478	15.7	Yes	3.18
Southern Columbia Middle School	Catawissa	5-8	438	14.7	No	n/a
Subtotals	**23**		**10,841**			
Totals	**92**		**52,869**			

ER Section 4.4.2.8 indicates that in Luzerne County the 1% to 2% increase in school enrollment during construction would not impact current capacity. However, the percent increase in student enrollment in Columbia County would be somewhat higher, 4.6% to 8.0%, and the increase in demand may not be met by increased taxes on housing alone.

The impact on capacity during operations would not be material as the percent in-migration of households would be less, and any capacity needs observed during construction would have been addressed during that period. Furthermore, the population projections for Luzerne County suggest a general decrease and only a modest growth in Columbia County (ER Table 2.5-3).

COLA Impact:
The BBNPP COLA ER will be revised as follows in a future revision of the COLA:

2.5.2.5 Local Educational System

Pennsylvania currently has a student-teacher ratio of 15.2 students per full time equivalent (FTE) teacher (NCES, 2009). According to the Pennsylvania Code for Academic Standards, pre-kindergarten programs must have a student-teacher ratio of no more than 20 students for one teacher and one teacher aide in a classroom (i.e., 20 students in a classroom for every 2 adults). Programs of high quality ordinarily have a student-teacher ratio of 17 students for one teacher and one teacher aide in a classroom (i.e., 17 students for every 2 adults). Programs operating under contract with community providers must comply with staffing qualifications as required by 22 Pa Code § 49.85(c) (relating to limitations) (PA Code, 2009).

The~~is~~ following sections describe~~s~~ the school district facilities and enrollment levels in the two counties comprising the ROI and, where appropriate, compare the student teacher ratios to the above state ratio. The two counties in the ROI have a total of 23 school districts with a total of 91 public schools plus one youth forestry camp school (juvenile justice service) with about 53,000 students enrolled during the 2005-2006 school year (NCES, 2008). There are also a total of 65 private schools in the ROI, with about 12,500 students enrolled (GS, 2008) (ST, 2008).

2.5.2.5.1 Luzerne County Public and Private Schools

The Luzerne County Public School System, which includes all of Luzerne County plus one school in Schuylkill County, has 16 school districts which includes 13 high schools, six middle schools, 45 elementary schools, one Intermediate Unit School, one Alternative School, and three Vocational Schools (which are high school level) (Table 2.5-20) (NCES, 2008). For the 2004-2005 fiscal year total revenues for the school districts was $452.1 million and the total expenditures for the school districts was $446.8 million (NCES, 2008). The public school system employed a total of 4,772 ~~full-time equivalents (~~FTEs~~)~~ in the 2005-2006 school year, of which 2,581 FTEs were teachers (NCES, 2008). The schools had a student-teacher ratio range of 13.0 to 27.2 students per FTE teacher (NCES, 2008). In the 2005-2006 school year, there were about 42,000 students enrolled in the Luzerne County public schools (NCES, 2008).

In addition to the public school system, Luzerne County has 57 private schools with about 11,000 students. Student-teacher ratios ranged from 3 to 35 students per FTE teacher in the private schools (see Table 2.5-21) (GS, 2008; ST, 2008).

~~The 2004-2005 fiscal year total revenues for all of the school districts was $452.1 million and the total expenditures for the school districts was $446.8 million (NCES, 2008).~~

~~In addition to the public school system, Luzerne County has 57 private schools with about 11,000 students. Student/teacher ratios ranged from 3 to 35 students per FTE teacher in the private schools (see Table 2.5-21) (GS, 2008; ST, 2008).~~

For Luzerne County, the student-teacher ratio for both public and private schools both exceeded and fell below the state average of 15.2 students per FTE teacher. In some schools, the student teacher ratio was as low as 3 and in others as high as 35 students per FTE teacher. Ratios within the nearby towns of Nanticoke and Shickshinny were generally above the state average.

In addition, a number of the public school districts were operating at capacity or above capacity for the individual buildings. Within the Hazleton Area School District, the capacity within each of the school buildings was evaluated by Highland Associates in 2007. Their study demonstrated that four of 10 schools had exceeded their capacity when compared against 2007/2008 enrollment projections. Capacity for this study was based on the assumption of approximately 25 students per classroom. In addition, a representative from the Greater Nanticoke Area School District identified five schools within the district as operating at 100 percent capacity. The superintendent from the Crestwood School District stated that the high school and middle school were operating at 112 percent capacity, while the elementary schools were operating at 96 percent of capacity.

2.5.2.5.2 Columbia County Public and Private Schools

The Columbia County Public School System, which includes all of Columbia County plus one school in Luzerne County, has seven school districts which include 12 elementary schools, five middle high schools, five high schools, and one vocational school (Table 2.5-20) (NCES, 2008). For the 2004-2005 fiscal year, total revenues for the school districts was $117.4 million and the total expenditures for the school districts was $110.8 million (NCES, 2008). The public school system employed a total of 1,489 FTEs in the 2005-2006 school year, of which 768 FTEs were teachers (NCES, 2008). The 2005-2006 school year had a student-teacher ratio range of 10.9 to 16.4 students per FTE teacher (NCES, 2008). There were about 10,800 students enrolled in the 2005-2006 school year in Columbia County (NCES, 2008).

In addition to the public school system, Columbia County has eight private schools with about 1,500 students. The student-teacher ratio ranges from 5 to 33 students per FTE teacher (Table 2.5-21) (GS, 2008) (ST, 2008).

For Columbia County, the student-teacher ratio for both public and private schools both exceeded and fell below the state average of 15.2 students per FTE teacher. In some schools, the student teacher ratio was as low as 5 and in others as high as 33 students per FTE teacher. The private schools tended to have a larger range than the public schools within Columbia County. The student-teacher ratios in Berwick during the 2005-2006 school year ranged between 13.3 and 15.9 students per FTE teacher. All but one of the 7 schools listed were below the state average (when compared to the 2006-2007 state average). Ratios within the Bloomsburg Schools system were below the state average during the 2005-2006 school year.

The Berwick Area School District is the primary school district within Columbia County, as well as one of the major employers. The school system accounts for grades kindergarten through 12th grade within 4 elementary schools, 1 middle school, and 1 high school. District wide enrollment for public schools is 3,160 and an additional 429 are enrolled in private school. Approximately 16 children are assigned to every one teacher depending on the class taught. The district employs 680 people, of which 279 are certified teaching professionals.

A Berwick Area School District representative also stated that the district is concerned over the age and condition of the existing school buildings. The representative felt that if capacity were reached, the district would face additional challenges with regard to maintenance and upkeep of existing physical structures since at least three of the buildings within the district are over 75 years of age. Classroom capacity within the buildings varies from 350 students in the elementary schools to 1,150 students in the high school.

~~Within~~ However, within the Berwick Area School District, overall enrollment has dropped over the last 10 years. Future plans for the district suggest that enrollment may rise due to its unique position of being located within both Luzerne and Columbia Counties. Funding for the school district has been stable based on the 2007-2008 annual budget of $41 million.

~~The 2004-2005 fiscal year total revenues for all the school districts was $117.4 million and the total expenditures for the school districts was $110.8 million (NCES, 2008).~~

~~In addition to the public school system, Columbia County has eight private schools with about 1,500 students. The student/teacher ratio ranges from 5 to 33 students per FTE (Table 2.5-21) (GS, 2008) (ST, 2008).~~

2.5.2.11 References

Highland Associates, 2007. Hazleton Area School District; District Study Update. September 18, 2007. Website accessed on July 17, 2009, http://www.hasd.k12.pa.us/fstudy.pdf.

NCES, 2009. National Center for Education Statistics (NCES), 2009. State Education Data Profiles, Pennsylvania. Website accessed on July 17, 2009, http://nces.ed.gov/programs/stateprofiles.

PA Code, 2009. 22 Pa Code § 4.20, Pre-kindergarten education. Website accessed on July 16, 2009, http://www.pacode.com/secure/data/022/chapter4/chap4toc.html.

Table 2.5-20 Public Schools Located in Luzerne County and Columbia County

County/Public School District/Schools	City/Location	Grades Taught	Number of Students	Students per FTE Teacher	Greater than State Average 15.2	Percent Decrease in School Ratio Needed to Meet the State Ratio of 15.2 (Note 5)
Luzerne County						
Bear Creek Community CS:						
Bear Creek Community Charter School	Wilkes-Barre	K-7	259	15.6	Yes	2.56
Crestwood SD:						
Crestwood High School	Mountain Top	9-12	1,104	21.4	Yes	28.97
Crestwood Middle School	Mountain Top	7-8	495	17.2	Yes	11.63
Fairview Elementary School	Mountain Top	K-6	773	19.1	Yes	20.42
Rice Elementary School	Mountain Top	K-6	790	17.9	Yes	15.08
Dallas SD:						
Dallas Elementary School	Dallas	K-5	697	18.0	Yes	15.56
Dallas High School	Dallas	9-12	869	16.6	Yes	8.43
Dallas Middle School	Dallas	6-8	684	17.5	Yes	13.14
Wycallis Elementary School	Dallas	K-5	450	21.2	Yes	28.30
Greater Nanticoke Area SD:						
GNA Elementary School	Nanticoke	3-5	443	16.5	Yes	7.88
Greater Nanticoke Area Education Center	Nanticoke	6-7	324	18.3	Yes	16.94
Greater Nanticoke Area High School	Nanticoke	8-12	953	20.7	Yes	26.57
J.F. Kennedy Elementary School	Nanticoke	2	132	20.6	Yes	26.21
K.M. Smith Elementary School	Nanticoke	K-1	322	20.5	Yes	25.85

Hanover Areas SD:						
Hanover Area Junior/Senior High School	Wilkes-Barre	7-12	1,044	17.4	Yes	12.64
Hanover Area Memorial Elementary School	Wilkes-Barre	5-6	291	13.3	No	n/a
Hanover Green Elementary School	Wilkes-Barre	K	134	13.5	No	n/a
Lee Park Elementary School	Wilkes-Barre	1-2	291	21.7	Yes	29.95
Lyndwood Elementary School	Wilkes-Barre	3-4	300	16.5	Yes	7.88
Hazleton Area SD:						
Arthur Street Elementary School	Hazleton	K-6	432	17.8	Yes	14.61
Drums Elementary/Middle School	Drums	K-8	731	19.2	Yes	20.83
Freeland Elementary/Middle School	Freeland	K-8	956	17.2	Yes	11.63
Hazle Elementary School	Hazleton	K-6	752	17.2	Yes	11.63
Hazleton Area High School	Hazleton	9-12	3,335	20.3	Yes	25.12
Heights Terrace Elementary/Middle School	Hazleton	K-8	1,072	18.1	Yes	16.02
Mcadoo Kelayres Elementary School	Mcadoo	K-6	426	15.3	Yes	0.65
Valley Elementary/Middle School	Sugarloaf	K-8	1,109	16.7	Yes	8.98
West Hazleton Elementary/Middle School	West Hazleton	K-8	973	17.6	Yes	13.64
Hazleton Areas Carrer Center SD:						
Hazleton Area Career Center	Hazleton	9-12	n/a	n/a	n/a	n/a
Lake-Lehman SD:						
Lake-Lehman Junior High School	Lehman	7-12	1,071	16.7	Yes	8.98
Lake-Noxen Elementary School	Harveys Lake	K-6	353	13.0	No	n/a
Lehman-Jackson Elementary School	Lehman	K-6	486	14.0	No	n/a
Ross Elementary School	Sweet Valley	K-6	248	13.9	No	n/a
Luzerne IU 18 SD:						
Luzerne Intermediate Unit 18	Kingston	n/a	n/a	n/a	n/a	n/a

Northwest Areas SD:						
Garrison Memorial School	Shickshinny	K-6	160	13.1	No	n/a
Hunlock Creek School	Shickshinny	K-6	284	15.6	Yes	2.56
Huntington Mills School	Shickshinny	K-6	308	17.5	Yes	13.14
Northwest Area High School	Shickshinny	7-12	668	15.2	No	n/a
Pittston Area SD:						
Ben Franklin Kindergarten Center	Dupont	K	199	19.9	Yes	23.62
Pittston Area High School	Pittston	9-12	1,079	20.2	Yes	24.75
Pittston Area Middle School	Pittston	6-8	760	16.5	Yes	7.88
Pittston Area Primary Center	Pittston	1-2	454	15.1	No	n/a
Pittston City Intermediate Center	Pittston	3-5	688	18.1	Yes	16.02
West Side AVTS:						
West Side AVTS School	Kingston	9-12	503	13.6	No	n/a
Wilkes-Barre Areas SD:						
Daniel J. Flood Elementary School	Wilkes-Barre	K-6	521	14.6	No	n/a
Dodson Elementary School	Wilkes-Barre	K-6	457	17.1	Yes	11.11
Dr. David W. Kistler Elementary School	Wilkes-Barre	K-6	903	16.8	Yes	9.52
Elmer L. Meyers Junior/Senior High School	Wilkes-Barre	7-12	949	14.0	No	n/a
G.A.R. Memorial Junior/Senior High School	Wilkes-Barre	7-12	919	14.8	No	n/a
Heights/Murray Elementary School	Wilkes-Barre	K-6	653	14.1	No	n/a
James M. Coughlin Junior/Senior High School	Wilkes-Barre	9-12	1,075	16.9	Yes	10.06
Solomon/Plains Elementary School	Plains	K-6	858	15.8	Yes	3.80
Solomon/Plains Junior High School	Plains	7-8	535	15.2	No	n/a
Wilkes-Barre AVTS:						
Wilkes-Barre AVTS School	Wilkes-Barre	9-12	n/a	n/a	n/a	n/a

Wyoming Area SD:						
Kennedy Elementary Center	Exeter	K-4	246	18.1	Yes	16.02
Montgomery Avenue Elementary School	West Pittson	K-6	475	16.8	Yes	9.52
Sara J. Dymond Elementary School	Pittston	K-6	231	13.9	No	n/a
Tenth Street Elementary School	Wyoming	K-5	359	16.1	Yes	5.59
Wyoming Area Secondary Center	Exeter	7-12	1,316	18.6	Yes	18.28
Wyoming Valley West SD:						
Chester Street Elementary School	Kingston	1-5	232	13.6	No	n/a
Dana Elementary Center	Forty Fort	K-5	553	16.3	Yes	6.75
Main Elementary Center	Plymouth	K-5	401	14.3	No	n/a
Pringle Street Elementary School	Kingston	K-4	96	12.0	No	n/a
Schuyler Avenue Elementary School	Kingston	K-5	241	17.2	Yes	11.63
State Elementary Center	Larksville	K-5	594	16.3	Yes	6.75
Third Avenue Elementary School	Kingston	K-5	163	27.2	Yes	44.12
Wyoming Valley West Middle School	Kingston	6-8	1,315	17.5	Yes	13.14
Wyoming Valley West High School	Plymouth	9-12	1,485	18.3	Yes	16.94
Other:						
Youth Forestry Camp #2 School	White Haven	7-12	49	6.1	No	n/a
Subtotals	**69**		**42,028**		-	-
Columbia County						
Benton Area SD:						
Appleman Elementary School	Benton	K-6	385	12.6	No	n/a
Benton Area Junior/Senior High School	Benton	7-12	382	12.7	No	n/a
Berwick Area SD:						
Berwick Area High School	Berwick	9-12	992	13.5	No	n/a
Berwick Area Middle School	Berwick	6-8	897	14.7	No	n/a

Fourteenth Street Elementary School	Berwick	K-5	214	13.8	No	n/a
Mulberry Street Elementary School	Berwick	K-5	88	10.9	No	n/a
Nescopeck Elementary School	Nescopeck	K-5	276	14.5	No	n/a
Orange Street Elementary School	Berwick	K-5	386	13.3	No	n/a
Salem Elementary School	Berwick	K-5	462	15.9	Yes	4.40
Bloomsburg Area SD:						
Beaver-Main Elementary School	Bloomsburg	K-5	104	14.1	No	n/a
Bloomsburg Area High School	Bloomsburg	9-12	488	13.5	No	n/a
Bloomsburg Area Middle School	Bloomsburg	6-8	440	13.1	No	n/a
Memorial Elementary School	Bloomsburg	K-5	454	13.5	No	n/a
W.W. Evans Memorial Elementary School	Bloomsburg	K-5	263	14.6	No	n/a
Central Columbia SD:						
Central Columbia Elementary School	Bloomsburg	K-4	712	15.4	Yes	1.30
Central Columbia High School	Bloomsburg	9-12	696	15.4	Yes	1.30
Central Columbia Middle School	Bloomsburg	5-8	713	16.4	Yes	7.32
Columbia Montour AVTS SD:						
Columbia-Montour AVTS School	Bloomsburg	9-12	682	16.0	Yes	5.00
Millville Area SD:						
Millville Area Elementary School	Millville	K-6	411	11.7	No	n/a
Millville Area Junior/Senior High School	Millville	6-12	344	11.1	No	n/a
South Columbia Area SD:						
Hartman Elementary Center	Catawissa	K-4	536	14.4	No	n/a
Southern Columbia High School	Catawissa	9-12	478	15.7	Yes	3.18
Southern Columbia Middle School	Catawissa	5-8	438	14.7	No	n/a
Subtotals	**23**		**10,841**			

Totals	**92**		**52,869**			

Notes:
FTE = full-time equivalent
K = kindergarten
PK = pre-kindergarten
CS = Charter School
SD = School District
IU = Intermediate Unit
AVTS = Area Vocational Technical School

1. Mcadoo is located in Schuylkill County but is part of the Hazleton Area school district including the budget.
2. The following schools are vocational schools: Hazleton Area Career Center, West Side AVTS School, and Wilkes-Barre AVTS School
3. Youth Forestry Camp #2 School - This is an juvenile justice detention school which is not part of the total revenue and expenditure numbers presented in Section 2.5.2.5.
4. Salem Elementary School is located in Luzerne County but part of the Berwick School District and budget in Columbia County.
5. An n/a indicates that the school student per FTE teacher ratio is less than or equal to the state average and does not need a percent decrease in school ratio to meet the state ratio of 15.2.

SE 2.5-8

ESRP 2.5.2

Summary: *Provide either service ratios or other measures of adequacy (e.g., comparison to national or state standards or averages) or an assessment of adequacy by local officials for key facilities and services in the proximate communities (police, fire, recreational sites, water, sewer/sewage, medical, education).*

Full Text: Impacts on community facilities are influenced by their existing and projected capacity and availability. Include this information in the assessment discussion.

Response:

Police Services

Luzerne County

According to the 2007 Crime in Pennsylvania Annual Uniform Crime Report, 621 total full-time law enforcement employees (officers and civilian staff) were working within Luzerne County (PSP, 2007). This amounts to 1.99 per 1,000 people in Luzerne County. Of these total employees, 550 are officers (state, county, and local; 1.77 per 1,000 people); 336 of the total are local officers (1.08 per 1,000 people).

A second source suggests the number of officers in 2006 was 2.4 officers per 1,000 residents (CRPA, 2009b).

If a standard of 1.5 officers per 1,000 people is used (Layton and Gloo, 2007), as is suggested by some national organizations, Luzerne County has a sufficient number of officers, because approximately 469.5 officers would be needed to meet the enforcement needs of the 2006 population of 313,020 (see ER Table 2.5-4).

If an additional 2,035 people (see ER Table 4.4-8) associated with the direct and indirect workforce, under the 35% in-migration scenario, in-migrate into Luzerne County due to the construction of BBNPP, along with 663 people during the last four years of construction due to preliminary commissioning and operational activities (see ER Table 5.8-2 and response to RAI SE 4.4-7), or 2,698 total, the impact would be minimal on the law enforcement capacity (rising from the 469.5 officers currently needed to 473.6 with the project) of the local officers, because the necessary number of officers already is met.

Columbia County

According to the 2007 Crime in Pennsylvania Annual Uniform Crime Report, 117 total full-time law enforcement employees (1.80 per 1,000 people) were working in Columbia County. Of this amount, 106 are officers (1.63 per 1,000 people); while of the total, 71 are local officers (1.09 per 1,000 people) (PSP, 2007).

A second source suggests that the number of officers in 2006 was 2.7 officers per 1,000 residents (CRPA, 2009a).

If a standard of 1.5 officers per 1,000 people is used (Layton and Gloo, 2007), as is suggested by some national organizations, Columbia County has a sufficient number of officers, because

approximately 97.5 officers would be needed to meet the enforcement needs of the 2006 population of 65,014 (see ER Table 2.5-4).

If an additional 2,156 people (see ER Table 4.4-8) associated with the direct and indirect workforce, under the 35% in-migration scenario, in-migrate into Columbia County due to the construction of BBNPP, along with 702 people during the last four years of construction due to preliminary commissioning and operational activities (see ER Table 5.8-2 and response to RAI SE 4.4-7), or 2,858 total, 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, as the necessary amount of officers has been met.

A summary table of potential law enforcement project needs for each county is provided below:

Potential Police Officer Project Needs, Luzerne and Columbia Counties

Number of Police Officers	Current	Needed* in 2006	Needed* with Project
Luzerne County	550	469.5	473.6
Columbia County	106	97.5	101.8

*Based upon a national standard of 1.5 officers per 1,000 people.

Fire Services

In 2005, the United States had a rate of 3.82 firefighters per 1,000 people. This rate was divided into 1.05 career firefighters and 2.77 volunteer firefighters (Karter, 2006). These figures do not represent recommended rates or a defined fire protection standard. An argument for this is that different communities need varying numbers of firefighters to cover the hours within a day (Karter, 2006).

One available standard, however, suggests that 1 firefighter is needed for every 1,000 people (CCS, 2009).

Luzerne County

As indicated in ER Section 2.5.2.9.4.1, a total of 2,391 firefighters are active in Luzerne County. The population in Luzerne County was 319,250 in 2000 and 313,020 in 2006, as shown in ER Table 2.5-4. This would provide an existing ratio of 7.49 firefighters per 1,000 people in 2000 and 7.64 in 2006. These numbers are greater than the typical ratio of career and volunteer firefighters within the U.S. as a whole, as well as far exceeding the available standard.

The number of firefighters that the county would need to meet its needs based upon the 1:1,000 standard and the 2006 population level, would be approximately 313 firefighters. The number of firefighters that the county could need to meet the needs of 2,698 people in-migrating into the county for the BBNPP project would be 316.

Columbia County

ER Section 2.5.2.9.4.2 indicates that Columbia County has 967 firefighters, with an additional 353 non-firefighter positions. The population in Columbia County was 64,151 in 2000 and 65,014 in 2006, as shown in ER Table 2.5-4. This would provide a ratio of 15.07 firefighters per 1,000 people in 2000 and 14.87 in 2006. These numbers are greater than the typical ratio of career and volunteer firefighters within the U.S. as a whole, as well as far exceeding the available standard.

The number of firefighters that the county would need to meet its needs based upon the 1:1,000 standard and the 2006 population level, would be approximately 65 firefighters. The number of firefighters that the county could need to meet the needs of 2,858 people in-migrating into the county for the BBNPP project would be 68.

A summary table of potential firefighter project needs for each county is provided below:

Potential Firefighter Project Needs, Luzerne and Columbia Counties

Number of Firefighters	Current	Needed* in 2006	Needed* with Project
Luzerne County	2,391	313	316
Columbia County	967	65	68

*Based upon a national standard of 1.0 firefighter per 1,000 people.

Recreational Sites

As shown in ER Sections 2.2.1, 2.2.3, and 2.5.2.6, the area surrounding the BBNPP site offers a considerable array of open space and recreational opportunities. There are numerous state, county, and local parks; trust lands; game lands; wildlife management units; state forests; hiking trails; and water courses (ER Tables 2.2-1 through 2.2-12 and ER Tables 2.5-22 through 2.5-24).

While additional resources are available within the ROI, universal standards are not available to identify the "appropriate" amount of recreational facilities within an area. A standard has been in place since 1981 that suggests 10 acres of parkland are required for every 1,000 people. This standard, however, has been cited as deficient for the way in which recreation and open space works today. A systems approach is now suggested, which incorporates aspects of level of service rather than acreage (Williams and Dyke, 1997).

Using the acreage of the four state parks alone (22,183 acres), the existing ratio for the ROI is 58.7 acres per 1,000 people, which is much greater than the standard of 10 acres for every 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.

Luzerne County

Luzerne County is part of the Northeast region of the Pennsylvania Department of Conservation and Natural Resources (PADCNR, 2004).

For over 15 years, Luzerne County has been developing an out-of-park trail system. The county system now includes over 35 miles of multi-use trails; 1.5 miles of town heritage trails/sidewalk improvements; 17 miles of riverfront and out-of-park hiking and mountain biking trails; and approximately 105 additional miles of multi-use trails or in-town trail systems in the planning stages (Luzerne County, 2008). The three county parks within Luzerne County are noted in ER Section 2.5.2.6.1.

Additional information about Rickett's Glen State Park is as follows:

- Ricketts Glen has 26 miles of trails.
- The park has 10,144 acres open for hunting, trapping, and training of dogs during established seasons.
- The park has a 9-mile loop trail used for horseback riding.
- Twenty-one waterfalls are along the Falls Trail within the Glens Natural Area, while one (Adams) is only a few hundred feet from a parking lot (PADCNR, 2006).

According to a Rickett's Glen State Park representative, average annual visitor numbers are approximately 750,000 to 800,000. These numbers tend to fluctuate annually. The greatest number of guests visit the park during June, July, and August. The representative indicated that the Park could easily handle an additional 3,000 people and did not anticipate any impacts associated with the construction and operation of the facility, or any changes required in staffing or facilities at the park.

In addition to the parks, game lands, forests, and campgrounds, trails also are available for public use. As part of the Luzerne County health initiatives, a listing of available recreational

trails identifies public areas in which residents and visitors alike can experience natural scenery (STHPLC, 2009). The trails include the following:

- Susquehanna Levee Trail: Luzerne County created a 14-mile network of trails from Wyoming to Plymouth on the west side of the river, and from Wilkes-Barre to Hanover on the east side. Walkers, joggers, in-line skaters, and cyclists can use the paved trails, which are 100% handicap accessible. Parking lots are strategically located along the length of the trail. Trailheads are present at Forty-Fort County Recreation Park, off of Route 11; Kingston Recreation Facility, off of 3rd Street; the far west end of Delaney Street in Hanover Township; and off of Powell Street in Plymouth Borough.
- Back Mountain Trail: This Suburban trail has a stone surface and runs from Luzerne Borough to Carverton Road in Trucksville. The trailhead is located at Parry Street in Luzerne Borough. The trail can be accessed by parking at the Knights of Columbus Parking lot and walking west on Parry Street.
- The Mocanaqua Loop Trail: This trail consists of four inter-connecting looping trails, which is approximately 9 miles of varying terrain along the northern reach of Penobscot Mountain. This trail has a natural earth surface and a hilly character. The trailhead is in Mocanaqua, on the east side of the Susquehanna River from Route 11 and Shickshinny Borough.
- Kirby Park Trails: These trails include four miles of marked trails that are located in the Kirby Park Natural Area, between the levee and the Susquehanna River.
- Lehigh Gorge Trail: This trail is 26 miles long and follows an abandoned rail line adjacent to the Lehigh River, from north of White Haven to Jim Thorpe. The trail is relatively flat, with a smooth stone surface. White Haven is the northern access area and can be reached via Exit 273 off of Interstate 80.
- Luzerne County National Recreation Trail: This is a 13-mile long rail trail along the east bank of the Susquehanna River, between Wilkes-Barre and Old Forge. Access is located at Pittston Riverfront Park on Water Street.
- The Tubs Nature Area: This trail consists of 2 miles in a preserved area highlighting scenic geological water features (STHPLC, 2009).

Columbia County

Columbia County is part of the Central region of the Pennsylvania Department of Conservation and Natural Resources (PADCNR, 2004).

The Rails to Trails Conservancy lists approximately 23 trails occurring within 50 miles of Berwick, PA. No specific information is available about the exact locations within Columbia County, unless registration is completed (RTTC, 2009). Additional water trails also are present.

As indicated in ER Section 2.5.1.1.3.2, no major parks or recreational attractions are located within Columbia County. In addition, as shown in ER Section 2.5.2.6.2, there is only one state park, three state game lands, and two county parks in the county. The state park is Rickett's Glen State Park, which also lies within Luzerne County.

Water/Sewer and Sewage Services

Water

According to the EPA, a US family of four will use 400 gallons of water per day (or 100 gallons per person per day, gpd). Of this amount, 30% is attributed to outdoor uses (EPA, 2009).

Based upon the 100 gpd/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, as indicated in ER Table 2.5-28 (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 produce this additional amount easily.

The table below provides a summary of current and future water supply needs for the two counties in the ROI:

Potential Water Supply Project Needs, Luzerne and Columbia Counties (gpd)

Water Supply	Current*	Design Capacity	Needed** for In-Migrants for the Project	Total Needed with Project	Current Percentage Used	Percentage Used with Project
Luzerne County	29,706,438	47,179,200	269,800	29,976,238	63.0	63.5
Columbia County	4,320,000	8,747,200	285,800	4,605,800	49.4	52.7
Total	34,026,438	55,926,400	555,600	34,582,038	60.8	61.8

*Based upon Average Production, excluding those for which design capacity was not available

**Based upon a standard of 100 gallons per day per capita.

Sewage

State code (PA Code, 2009b), identifies the following anticipated sewage production levels in gallons per day (gpd) per person:

- Residential (single family) – 400 gpd
- Hotels and Motels – 100 gpd
- Multiple Family Dwellings - 400 gpd
- Rooming houses (per unit) – 200 gpd

According to the Governor's Center for Local Government Service, Pennsylvania has 224 active water authorities within the State, along with 507 sewer authorities (GCLGS, 2008). Average capacities and the population served by each were not available from this source.

Within Pennsylvania, small community wastewater facilities on average serve 32% of the population and comprise 21% of total wastewater treatment and collection needs (EPA, 2004). A clear representation of the total capacity in use was not available from this source.

According to a representative from the Greater Hazleton Sewer Authority (GHSA), the local capacity is approximately 9-10 million gallons of water flow per day. The representative has stated they would be taking in less water, but he believes that clean water is entering the system; this is referred to as inflow and infiltration (INI). The INI distorts the amount of water actually received. On dry days, they tend to receive 4-4.5 million gallons per day.

By 2011, the GHSA plans to have their system upgrades in place. They have been approved for $44 million worth of upgrades to the system by the state of Pennsylvania. This would allow for an increase in approximately 20% capacity (some estimates suggest 25-30%, but he provided the 20% as a conservative amount). According to this representative, he believes that there currently is sufficient capacity for the existing population, but due to the age of the system and the INI, he feels that the upgrade is necessary. This upgrade will allow them to handle the influx of population if the BBNPP is built.

The Dallas Area Municipal Authority is responsible for the conveyance of water to the Wyoming Valley Sewer Authority. The facility can handle 13 million gallons per day within the existing system. They currently are processing only 3 million gallons per day. The representative did not have additional information regarding the capacities, but did say that on average a 3.5 person household uses 116 gallons a day in this area.

A representative of the Wyoming Valley Sewer Authority stated that the overall licensed capacity for this facility was 66 million gallons per day (mgd). On average, they receive approximately 33 mgd. This number can fluctuate depending upon weather conditions. During dry weather, they may only receive and treat 13-15 mgd, and during wet weather over 100 mgd. This Authority currently has over 100,000 accounts and, according to the representative, they easily could handle the additional number of people that might in-migrate into Luzerne County as a result of the construction and operation of the BBNPP. He does not anticipate any necessary changes to the staff or treatment plant.

Based upon a standard of 150 gallons per day of waste water per capita, as indicated in ER Rev. 1 Section 2.5.2.9.2, the following additional needs could result:

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 2.5-30. As indicated by the representatives from the various authorities, the existing systems should be able to treat this additional demand easily.

The following table provides a summary of existing sewage design capacity and the amount that could be generated by the in-migrating population.

Potential Waste Water Capacity Project Needs, Luzerne and Columbia Counties (gpd)

Sewage Generated	Design Capacity*	Needed** for In-Migrants for the Project	Percentage of Total Design Capacity
Luzerne County	62,720,000	404,700	0.65
Columbia County	9,122,900	428,700	4.70
Total	71,842,900	833,400	1.16

*Based upon Average Production, excluding those for which design capacity was not available

**Based upon a standard of 150 gallons per day of waste water per capita.

Medical Services

The Henry Kaiser Family Foundation research on state hospitals shows that Pennsylvania had approximately 3.2 hospital beds per 1,000 people in 2007. The United States average was 2.7 hospital beds per 1,000 people in the same year (Kaiser, 2007). The Hill Burton Act of 1946 established a standard of 4.5 beds per 1,000 people (OTA, 1990). However, many medical professionals believe this standard is out of date.

In 2004, Pennsylvania had 329 physicians per 100,000 people (3.29 per 1,000). In addition, the state had 323 beds per 100,000 people (3.23 per 1,000) (USCB, 2008b).

Luzerne County

In 2004, Luzerne County had 252 physicians per 100,000 people (2.52 per 1,000) and 311 beds per 100,000 people (3.11 per 1,000). The ratio of physicians and hospital beds for the population was less than the state ratios. However, the ratio of hospital beds in the county was greater than the US ratio (USCB, 2008b).

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. As shown below, an additional nine hospital beds and nine physicians could be needed for the project in-migrating population.

Columbia County

In 2004, Columbia County had 156 physicians per 100,000 people (1.56 per 1,000) and 630 beds per 100,000 people (6.30 per 1,000). The ratio of physicians was less than the state ratio. However, the ratio of hospital beds was greater than the state and US ratos (USCB, 2008b).

If 2,858 people in-migrated to Columbia County during construction, the ratio of physicians would be lessened 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. As shown below, no additional hospital beds and nine additional physicians could be needed for the project in-migrating population.

The following table provides a summary of the current and projected need with the BNPP project for hospital beds and physicians within Luzerne and Columbia counties:

Current and Potential Hospital Bed and Physician Needs, Luzerne and Columbia Counties

	Number of Beds/ Physicians in 2006	Current Ratio Per 1,000 People	State Ratio	US Ratio	Number of Beds/ Physicians Needed** in 2006	Ratio with Project	Number of Beds/ Physicians Needed** with Project
Number of Hospital Beds*			3.23	2.70			
Luzerne County	973.49	3.11			1,011.05	3.08	1,019.77
Columbia County	409.59	6.30			210.00	6.04	219.23
Number of Physicians*			3.29	n/a			
Luzerne County	788.81	2.52			1,029.84	2.50	1,038.71
Columbia County	101.42	1.56			213.90	1.49	223.30

*Based upon United States Census Data for 2004.

**Based upon the state ratio.

Educational Services

Capacity

Refer to the response to RAI SE 2.5-7, which provides information about the capacity of the local school districts within the vicinity of the BBNPP in Luzerne and Columbia Counties. It includes information obtained from interviews with district offices, as well as data available from public sources.

Student to Teacher Ratios

Refer to the response to RAI SE 2.5-7, which provides information about the existing student to teacher ratios for both public and private schools in Luzerne and Columbia Counties. It includes information obtained from interviews with district offices, as well as data available from public sources.

References Cited in Response:

PA Code, 2009b. 25 PA Code § 73.17. Sewage flows. Website accessed on August 6, 2009, http://www.pacode.com/secure/data/025/chapter73/s73.17.html.

CCS, 2009. Securing a Future of Excellence Together, Website accessed on April 14, 2009, http://centralcountysafet.com/5.html.

CRPA, 2009a. Center for Rural Pennsylvania (CRPA), n.d.(a). County Profiles: Columbia County. Website accessed on August 4, 2009, http://www.ruralpa2.org/county_profiles.cfm.

CRPA, 2009b. Center for Rural Pennsylvania (CRPA), n.d.(b). County Profiles: Luzerne County. Website accessed on August 4, 2009, http://www.ruralpa2.org/county_profiles.cfm.

EPA, 2004. Environmental Protection Agency, 2004. Pennsylvania Clean Watersheds Needs Survey 2004. Website accessed on July 17, 2009, http://www.epa.gov/cwns/pa.pdf.

EPA, 2009. Environmental Protection Agency, 2009. Outdoor Water Use in the United States. Website accessed on August 6, 2009, http://www.epa.gov/WaterSense/pubs/outdoor.htm.

GCLGS, 2008. Governors Center for Local Government Services (GCLGS), 2008. Pennsylvania Local Fact Sheet. January 7, 2008. Website accessed on July 17, 2009, www.newpa.com/get-local-gov-support/download.aspx?id=218 .

Kaiser, 2007. Henry Kaiser Family Foundation (Kaiser), 2007. Statehealthfacts.org. Pennsylvania State. Website accessed on July 17, 2009, http://www.statehealthfacts.org/profileind.jsp?cat=8&sub=94&rgn=40.

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

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.

Luzerne County, 2008. Luzerne County Trails. Website accessed on August 7, 2009, http://www.luzernecounty.org/county/departments_agencies/recreation/trails.

OTA, 1990. Office of Technology Assessment (OTA), 1990. Health Care in Rural America. Congress of the United States. OTA-H-434. Website accessed on August 13, 2009, http://www.princeton.edu/~ota/disk2/1990/9022/902201.PDF.

PADCNR, 2004. Pennsylvania Department of Conservation and Natural Resources(PADCNR), 2004. Pennsylvania's Recreation Plan 2004-2008. Website accessed on August 7, 2009, http://www.dcnr.state.pa.us/brc/publications/Pubs/brcrecplan.pdf.

PADCNR, 2006. Pennsylvania Department of Conservation and Natural Resources (PADCNR), 2006. A Recreational Guide for Ricketts Glen State Park. Website accessed on August 10, 2009, http://www.dcnr.state.pa.us/stateParks/parks/rickettsglen/rickettsglen_text_pdf.pdf.

PAFBC, 2009. Pennsylvania Fish and Boat Commission (PAFBC), 2009. Water Trail Guides. Website accessed on July 22, 2009, http://www.fish.state.pa.us/watertrails/trailindex.htm#8.

PSP, 2007. Pennsylvania State Police (PSP), 2007. 2007 Crime in Pennsylvania Annual Uniform Crime Report. Website accessed on August 4, 2009, http://ucr.psp.state.pa.us/UCR/Reporting/Annual/AnnualFrames.asp?year=2007

RTTC, 2009. Rails to Trails Conservancy (RTTC), 2009. General Search Engine for Trails within 50 Miles of Berwick, PA. Website accessed on July 22, 2009, http://www.traillink.com/TrailSearch.aspx?tn=&st=PA&ct=Berwick&sp=N.

STHPLC, 2009. Steps To A Healthier PA Luzerne County, Website accessed on April 9, 2009, http://www.stepstoahealthierluzernecounty.org.

USCB, 2008b. 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. Williams, Richard L. and Peter T. 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. Illinois Periodicals Online Feature Article. March/April 1997. Website accessed on August 7, 2009, http://www.lib.niu.edu/1997/ip970317.html.

COLA Impact:

BBNPP COLA ER Section 2.5.2 will be revised for Educational Services in response to BBNPP ER RAI SE 2.5-7.

The BBNPP COLA ER will be revised as follows in a future revision of the COLA:

2.5.2.9.3 Police and Sheriff Services

The two-county ROI receives law enforcement services from the Pennsylvania Department of State Police, the Luzerne County Sheriff's Department, Columbia County Sheriff's Department, and the local cities, towns, township, or borough police departments.

2.5.2.9.3.1 Luzerne County

The Luzerne County Sheriff's Office law enforcement division includes road patrol, the civil division, community service division, gun permit division, protection from abuse division, real estate division, the search and rescue division, sheriffs sales, and the warrants division (LC, 2008). In addition, there are 37 police departments in the County (USAC, 2008).

Luzerne County also operates a jail with 303 security officers, 9 administration staff members, 19 treatment staff members, and 23 support staff members. The county jail has an average daily population of 717 people (PADOC, 2007) (PADOC, 2008).

Local police departments assist in the overall law enforcement efforts in the County. Based on conversations with the Salem Township Police Department (STPD), the office is staffed by 3 fulltime and 4 part-time officers and operates on a shortened schedule, when compared to other departments in Luzerne County. In 2007, the Department handled 2,536 calls. In the prior two years, the department had 4,487 total calls. The STPD had an approximate $170,000 operating budget.

The Pennsylvania State Police handles all calls when local officers are not on duty. The Pennsylvania State Police also have an office located in Hazleton and a second station in Wyoming. These stations house Troop N with 244 enlisted and civilian personnel. The troop service area covers 1,766 mi2 (4,574 km2) and includes service for approximately 600,000 people. In 2006, Troop N handled 47,311 incidents. The Troop P Shickshinny Station, which also serves Luzerne County, is located in Berwick (PSP, 2008a) (PSP, 2008b).

According to the 2007 Crime in Pennsylvania Annual Uniform Crime Report, 621 total full-time law enforcement employees (officers and civilian staff) were working within Luzerne County (PSP, 2007). This amounts to 1.99 per 1,000 people in Luzerne County. Of these total employees, 550 are officers (state, county, and local; 1.77 per 1,000 people); 336 of the total are local officers (1.08 per 1,000 people).

If a standard of 1.5 officers per 1,000 people is used, as is suggested by some national organizations, Luzerne County had a sufficient number of officers. Approximately 469.5 officers were needed to meet the enforcement needs of the population in 2006 (Layton and Gloo, 2007).

2.5.2.9.3.2 Columbia County

The Columbia County Sheriff's Office law enforcement division includes firearms, the civil division, warrants, protection from abuse, courtroom security, training, and prisoner transport

(CC, 2008). The primary function of the Columbia County Sheriff's Department (CCSD) is to transport prisoners, serve as courtroom security, and to serve/administer Protection from Abuse (PFA) orders, along with responsibilities for physical service within civil processes. A departmental representative stated that deputies within the CCSD do not typically respond to calls within the County; public calls are handled by the local authority or State Police. For this reason, the total number of calls handled by this department is not available. The CCSD was staffed by 7 full-time and 6 part-time deputies in FY 2008. The representative indicated that they currently are headquartered in an office within a municipal building, where their jail is also located. The existing staff is operating at capacity, and the representative stated that they have additional staff and capital/facility needs, such as a new headquarters, improvements to the jail, and vehicle purchases.

The average inmate population in the Columbia County jail is 126 inmates per day. The annual prison budget for 2007 was about $2.86 million. This budget allowed for 54 full-time security staff, 4 full-time administrative staff, 1 treatment staff member, and 1 additional support member (PADOC, 2007) (PADOC, 2008).

There are eight local police departments that assist with law enforcement efforts within Columbia County (USAC, 2008). According to a department representative, the Berwick Police Department has a staff of 15 full-time officers and 4 part-time officers supported by 2 civilian staff members. In 2007, the department received 5,694 calls. The department has holding cells for processing, as well. The Berwick Police Department operates on a budget of approximately $1.3 million. The representative suggested that current needs called for 1 to 2 additional patrol officers and updates to the current vehicle fleet and computer equipment. Troops P and N of the Pennsylvania State Police serve the Columbia County area. Troop N has a station located in Bloomsburg (PSP, 2008a) (PSP, 2008b).

According to the 2007 Crime in Pennsylvania Annual Uniform Crime Report, 117 total full-time law enforcement employees (1.80 per 1,000 people) were working in Columbia County. Of this amount, 106 are officers (1.63 per 1,000 people); while of the total, 71 are local officers (1.09 per 1,000 people) (PSP, 2007).

If a standard of 1.5 officers per 1,000 people is used, as is suggested by some national organizations, Columbia County had a sufficient number of officers. Approximately 97.5 officers were needed to meet the enforcement needs of the population in 2006 (Layton and Gloo, 2007).

2.5.2.9.4 Fire Suppression Services

In 2005, the United States had a rate of 3.82 firefighters per 1,000 people. This rate was divided into 1.05 career firefighters and 2.77 volunteer firefighters (Karter, 2006). These figures do not represent recommended rates or a defined fire protection standard, and different communities may need varying amounts of firefighters to cover the hours within a day (Karter, 2006).

One available standard, however, suggests that 1 firefighter is needed for every 1,000 people (CCS, 2009).

2.5.2.9.4.1 Luzerne County

According to the U.S. Fire Administration, there are 68 fire departments with 87 fire stations in Luzerne County with 2,391 active firefighters that are either career, volunteer, or paid per call firefighters. In addition, there are 970 non-firefighter civilians or volunteers within the fire

departments (USFA, 2008). The number of stations and an indication of the general distribution of volunteers are provided in Table 2.5-31.

The Salem Township Volunteer Fire Company is one of several companies that provides service within Luzerne County. The township has one fire station with 25 to 30 volunteer firefighters. According to a representative of the Company, no paid personnel are present. Because the Company is staffed only by volunteers, dedicated search and rescue capabilities are not available. The Company's equipment consists of five vehicles, including two brush trucks, one tanker, one engine, and one rescue vehicle. An average of 140 calls are taken per year. According to the representative, the Company has agreements with East Berwick, Mocanaqua, Summer Hill, Shickshinny, and Nescopeck Township to assist in the provision of services. Current needs for the Company include the replacement of the engine and additional volunteers. The building, which houses the engines, also may require updates because the new vehicle sizes are difficult to accommodate with the older station. Discussions also have occurred regarding potentially merging the Salem Township Volunteer Fire Company with the East Berwick Hose Company.

As shown in Table 2.5-4, the population in Luzerne County was 319,250 in 2000 and 313,020 in 2006. This would provide an existing ratio of 7.49 firefighters per 1,000 people in 2000 and 7.64 firefighters per 1,000 people in 2006. These numbers are greater than the typical ratio for career and volunteer firefighters within the U.S., as well as exceeding the available standard. The number of firefighters that the county would need to meet its needs, based upon the 1:1,000 standard and the 2006 population level, would be approximately 313 firefighters.

2.5.2.9.4.2 Columbia County

According to the U.S. Fire Administration, there are 23 fire departments with 27 fire stations in Columbia County with 967 active firefighters that are either volunteer or paid per call firefighters. In addition, there are 353 non-firefighter civilians or volunteers within the fire departments (USFA, 2008). The number of stations and an indication of the general distribution of volunteers are provided in Table 2.5-31.

The size and staff characteristics of the fire stations vary throughout the county. One of the largest municipal fire departments is the Berwick Fire Department. According to a representative of the Berwick Fire Department, their services consist of five operating buildings and a volunteer force of 100 firefighters. The stations have a total of four engines dating between 2003 and 2008, one ladder truck (1998), one cascade, one heavy rescue, and one water rescue vehicles. Of the 100 firefighters, 25 to 30 can operate as search and rescue personnel. In 2007, the Berwick Fire Department answered 369 calls, of which 10 were for search and rescue operations. The representative stated that the department does not have additional existing staff or equipment needs.

As shown in ER Table 2.5-4, the population in Columbia County was 64,151 in 2000 and 65,014 in 2006. This would provide a ratio of 15.07 firefighters per 1,000 people in 2000 and 14.87 firefighters per 1,000 people in 2006. These numbers are greater than the typical ratio for career and volunteer firefighters within the U.S., as well as exceeding the available standard. The number of firefighters that the county would need to meet its needs, based upon the 1:1,000 standard and the 2006 population level, would be approximately 65 firefighters.

2.5.2.6 Area Recreational Opportunities

The area surrounding the BBNPP site offers a considerable array of open space and recreational opportunities. There are numerous state, county, and local parks; trust lands; game lands; wildlife management units; state forests; hiking trails; and water courses.

Based upon the acreage of the state parks located in the ROI (22,183 acres), the existing ratio for parkland is 58.7 acres per 1,000 people, which is below a suggested standard of 10 acres for every 1,000 people (Williams and Dyke, 1997). Additional capacity is provided by county, local parks, trust lands and game lands not included in the state parkland inventory.

2.5.2.6.1 Luzerne County

In Luzerne County there are four state parks, six state game lands, one state forest area, and three county parks. Each is unique in its own way and offers a multitude of outdoor activities to visitors. They are managed by the PA Department of Conservation and Natural Resources, PA Game Commission, and the Luzerne County Division of Parks. These areas provide ample opportunities for birdwatching, snowmobiling, skiing, cross country skiing, fishing, hunting, camping, canoeing, kayaking, walking, running, bike riding, hiking, horseback riding, rock climbing, golfing, swimming, and exploring cultural and historic areas. In addition, there are opportunities for picnicking, outdoor performances, areas to rent for company or family gatherings, historic sites, playgrounds, athletic fields, and much more.

The Luzerne County state game lands (SGL) include the following designated routes: SGL 57 approximately 8 mi (12.9 km); SGL 91 approximately 6 mi (9.7 km), SGL 91 approximately 2 mi (3.2 km), SGL 119 approximately 8.5 mi (13.7 km), SGL 207 approximately 1 mi (1.6 km), SGL 260 approximately 4.5 mi (7.2 km), and SGL 292 approximately 5 mi (8.0 km). These areas offer recreational activities that include but are not limited to hiking, horse back riding, biking, hunting, and snowmobiling (PAGC, 2008).

The state forest located in Luzerne County is Lackawanna State Forest, which has diverse recreational opportunities. The state forest is approximately 8,115 ac (3,284 ha) of land in two separate tracks. The two tracts are the Thornhurst tract in Lackawanna County and the West Nanticoke tract in Luzerne County. The West Nanticoke tract offers over 1,400 ac (567 ha) of hunting fishing, hiking, and nature study (PADCNR, 2008).

The four state parks located in Luzerne County include Lehigh Gorge, Frances Slocum, Ricketts Glen, and Nescopeck. Lehigh Gorge is located in Luzerne and Carbon Counties. The Lehigh Gorge State Park is approximately 4,548 ac (1,841 ha) of park land that follows the Lehigh River from Francis E. Walter Dam in the north to Jim Thorpe, PA, in the south. The Lehigh Gorge Trail follows over 20 mi (32 km) of abandoned railroad grade along the river, providing many recreational opportunities. Recreational opportunities include hiking, biking, whitewater boating, fishing, hunting, wildlife watching, and winter activities. Frances Slocum state park consists of 1,035 ac (419 ha) in northeastern Luzerne County. Recreational opportunities include hiking, trail biking, picnicking, swimming, boating, fishing, hunting, sledding, ice fishing, ice skating, organized group tenting, and camping. Nescopeck State Park is bordered on the south by steep Mount Yeager and on the north by Nescopeck Mountain. The state park is 3,550 ac (1,416 ha) encompassing wetlands, rich forests, and diverse habitats. Recreational opportunities include hiking, fishing, hunting, wildlife watching, and cross country skiing. Ricketts Glen State Park harbors Glens Natural Area, a national natural landmark. Ricketts Glen is comprised of 13,050 acres (5,281 ha) in Luzerne, Sullivan, and Columbia counties. Recreational opportunities

include hiking, horseback riding, picnicking, swimming, boating, fishing, hunting, waterfalls, winter activities, organized group tenting, cabins, and camping (PADCNR, 2008).

Luzerne County has three county parks, Moon Lake Park, Luzerne County Sports Complex, and The Tubs Nature Area (LC, 2008). The 76 local municipalities in Luzerne County provide a number and variety of parks and recreation areas. One example is the Wilkes-Barre Riverfront Park which the City of Wilkes-Barre owns and maintains. The park has 91 acres (37 ha) of open space and floodplain forest along the Susquehanna River.

The Susquehanna Riverlands Environmental Preserve is a 1,200 ac (486 ha) preserve encompassing a wide variety of upland and wetland habitats along both sides of the Susquehanna River. The Riverlands Recreation Area includes natural and recreational areas including the Riverlands Nature Center, the Riverlands Recreation Area, Lake Took-A-While (a 30 ac (12 ha) fishing lake and a restored section of the North Branch Canal), and the Wetlands Nature Area (Section 2.2.1).

As shown in Table 2.5-22 (MLP, 2008) (PADCNR, 2008) (PAFBC, 2008), Luzerne County has 13 boat launch sites. The lakes and ponds have different requirements as to the type of watercraft that is allowed on the water. Some of the lakes are non-motorized waterbodies, while others prohibit internal combustion motors, certain size horsepower motors, or implement speed restrictions. As shown in Table 2.5-23 (PAFBC, 2008), there are only three charter boat/fishing guides in Luzerne County.

In Luzerne County there are four state parks, six state game lands, one state forest area, and three county parks. Each is unique in its own way and offers a multitude of outdoor activities to visitors. They are managed by the PA Department of Conservation and Natural Resources, PA Game Commission, and the Luzerne County Division of Parks. These areas provide ample opportunities for bird watching, snowmobiling, skiing, cross country skiing, fishing, hunting, camping, canoeing, kayaking, walking, running, bike riding, hiking, horseback riding, rock climbing, golfing, swimming, and exploring cultural and historic areas. In addition, there are opportunities for picnicking, outdoor performances, areas to rent for company or family gatherings, historic sites, playgrounds, athletic fields, and much more.

There are 13 campgrounds within Luzerne County within a 30-mi radius (48 km) of Berwick providing various types of facilities and experiences (Table 2.5-24) (CPA, 2008) (CU, 2008) (GC, 2008) (HC, 2008) (HLC, 2008) (MLP, 2008) (PADCNR, 2008) (RVPR, 2008) (WG, 2008). There are about 1,389 camp sites at these facilities.

For over 15 years, Luzerne County also has been developing an out-of-park trail system. The county system now includes over 35 miles of multi-use trails; 1.5 miles of town heritage trails/sidewalk improvements; 17 miles of riverfront and out-of-park hiking and mountain biking trails; and approximately 105 additional miles of multi-use trails or in-town trail systems in the planning stages (Luzerne County, 2008).

Trails located within Luzerne County include the following:

- Susquehanna Levee Trail: Luzerne County created a 14-mile network of trails from Wyoming to Plymouth on the west side of the river, and from Wilkes-Barre to Hanover on the east side. Walkers, joggers, in-line skaters, and cyclists can use the paved trails, which are 100% handicap accessible. Parking lots are strategically located along the length of the trail. Trailheads are present at Forty-Fort County Recreation Park, off of

Route 11; Kingston Recreation Facility, off of 3rd Street; the far west end of Delaney Street in Hanover Township; and off of Powell Street in Plymouth Borough.

- Back Mountain Trail: This Suburban trail has a stone surface and runs from Luzerne Borough to Carverton Road in Trucksville. The trailhead is located at Parry Street in Luzerne Borough. The trail can be accessed by parking at the Knights of Columbus Parking lot and walking west on Parry Street.

- The Mocanaqua Loop Trail: This trail consists of four inter-connecting looping trails, which is approximately 9 miles of varying terrain along the northern reach of Penobscot Mountain. This trail has a natural earth surface and a hilly character. The trailhead is in Mocanaqua, on the east side of the Susquehanna River from Route 11 and Shickshinny Borough.

- Kirby Park Trails: These trails include four miles of marked trails that are located in the Kirby Park Natural Area, between the levee and the Susquehanna River.

- Lehigh Gorge Trail: This trail is 26 miles long and follows an abandoned rail line adjacent to the Lehigh River, from north of White Haven to Jim Thorpe. The trail is relatively flat, with a smooth stone surface. White Haven is the northern access area and can be reached via Exit 273 off of Interstate 80.

- Luzerne County National Recreation Trail: This is a 13-mile long rail trail along the east bank of the Susquehanna River, between Wilkes-Barre and Old Forge. Access is located at Pittston Riverfront Park on Water Street.

- The Tubs Nature Area: This trail consists of 2 miles in a preserved area highlighting scenic geological water features (STHPLC, 2009).

2.5.2.6.2 Columbia County

In Columbia County there is one state park, 3 state game lands, and two county parks. The state park is Rickett's Glen State Park, which also lies within Luzerne County. Rickett's Glen is described in Section 2.5.2.6.1.

The Columbia County state game lands (SGL) include the following designated routes: SGL 58 approximately 11.3 miles (18.2 km), SGL 226 approximately 4.3 mi (6.9 km), SGL 226 approximately 3 mi (4.8 km), and SGL 329 approximately 0.9 mi (1.4 km). These areas offer recreational activities that include but are not limited to hiking, horse back riding, biking, hunting, and snowmobiling (PAGC, 2008). The two county parks include Bloomsburg Town Park and Twin Bridges Park, currently under construction (CC, 2008).

As shown in Table 2.5-22 (MLP, 2008) (PADCNR, 2008) (PAFBC, 2008), Columbia County has three boat launch sites. The lakes and ponds have different requirements as to the type of watercraft that are allowed on the water. Some of the lakes are non-motorized waterbodies, while others prohibit internal combustion motors, certain size horsepower motors, or implement speed restrictions. As shown in Table 2.5-23 (PAFBC, 2008), there are only two charter boat/fishing guides in Columbia County.

There are 15 campgrounds in Columbia County within a 30 mi (48 km) radius of Berwick providing various different types of facilities and experiences (Table 2.5-24) (CPA, 2008) (CU,

2008) (GC, 2008) (HC, 2008) (HLC, 2008) (MLP, 2008) (PADCNR, 2008) (RVPR, 2008) (WG, 2008). There are about 1,509 camp sites at these facilities.

In addition, Rails to Trails Conservancy lists approximately 23 trails occurring within 50 miles of Berwick, PA (RTTC, 2009). Many of these are abandoned railroad beds converted into bike and walking trails. The Pennsylvania Fish and Boat Commission also provides a guide for water trails, the closest to the BBNPP being the North Branch Susquehanna River Water Trail that extends from New York to Sunbury, PA (PAFBC, 2009).

2.5.2.9.2.1 Luzerne County

Table 2.5-28 lists the largest municipal water suppliers (serving greater than 4,500 people) in Luzerne County (SSES, 2006). Of these water systems, the Crystal Lake system is operating at 83% of capacity during maximum production, Nesbitt is operating at 92% of capacity, and the Watres system is operating at 100% of capacity. Use of average capacity is only high for the Nesbitt system, with 83% use of capacity.

Based on reviewing the Environmental Protection Agency's (EPA) Safe Drinking Water Information System (SDWIS) which provides information about public water systems and their violations of EPA's drinking water regulations, there were 317 listings serving a population of 319,227 (EPA, 2008) (Table 2.5-29). EPA regulates public water systems; it does not have the authority to regulate private drinking water wells.

Surface water is the primary source of potable water for the majority of Luzerne County residents. Sources include lakes, rivers, reservoirs, and their tributaries, but not the Susquehanna River. The Susquehanna River is a source for drinking water for residents south of Danville Borough in Montour County, PA. Currently, both surface and groundwater sources in the county provide adequate supply for the population (SSES, 2006).

At times, water quality issues have been identified in selected surface water bodies and groundwater sources from both point source and non-point source pollution. These issues have included excessive metals concentrations, acid mine drainage, turbidity, excessive sedimentation, sewage contamination, landfill leachate, and excessive volatile chemicals, nitrates/nitrites, pesticides, petroleum products, and underground storage tank contamination. Although water quality has been an issue at some source locations, most sources and municipal water suppliers are able to provide water yields capable of sustaining both domestic and non-domestic uses (SSES, 2006).

According to a representative of the Pennsylvania Department of Environmental Protection, Northeast Region, Luzerne County has a number of sewer authorities. The largest is the Wyoming Valley Sanitary Authority (WVSA), which has a capacity of over 32 million gpd, while the Greater Hazleton Joint Sewer Authority (GHJSA) has a permitted average of 8.9 million gpd at the treatment facility (GHJSA, 2008) (WVSA, 2008). The Mountaintop Area Joint Sewer Authority and the Lower Lackawanna Valley Sewer Authority (LLVSA) also have capacities of over 1 million gpd. Several smaller authorities operate in Luzerne County, including but not limited to the Conyngham Borough Authority, the Butler Township Sewer Authority, the Freeland Sewer Authority, the Shickshinny Sewer Authority, and the Nescopeck Sewer Authority. The smaller authorities typically can handle 100,000 to 1 million gpd.

A representative of the Wyoming Valley Sanitary Authority (WVSA) stated that the overall license capacity for this facility was 66 million gallons per day (mgd). On average, this Authority receives approximately 33 mgd. This amount can fluctuate depending upon the weather

conditions. During dry weather, WVSA may receive and treat 13-15 mgd, and during wet weather over 100 mgd. This Authority currently has over 100,000 accounts. The Authority does not have any current staffing or facility needs.

A representative from the Greater Hazleton Sewer Authority (GHSA) stated that the local capacity is approximately 9-10 million gallons of water flow per day. The representative stated that the Authority would be taking in less water, but he believed that clean water was entering the system; this is referred to as inflow and infiltration (INI). The INI distorts the amount of water actually received. On dry days, they tend to receive 4-4.5 mgd.

By 2011, the GHSA plans to have numerous system upgrades in place. The GHSA was approved for $44 million worth of upgrades to the system by the Commonwealth of Pennsylvania. This would allow for an increase in approximately 20% capacity (some estimates suggest 25-30%, but the 20% is provided as a conservative amount). According to this representative, there currently is sufficient capacity for the existing population, but due to the age of the system and the INI, the upgrade is necessary.

Combined sewer outfalls also are present in Luzerne County. These systems carry both rain water and sewage in the same pipe. The WVSA operates 54 outfalls, the LLVSA has 26, the GHJSA has 15, and the Freeland Authority has one. The NPDES permits provided information regarding the overall accepted flow at each facility. Additional information regarding the individual sewer authorities was limited due to the lack of content on the internet. (USEPA, 2008b)

2.5.2.9.6 Hospitals and Doctors

In 2007, Pennsylvania had approximately 3.2 hospital beds per 1,000 people, and the United States ratio was 2.7 in the same year (Kaiser 2007). In 2004, Pennsylvania had 329 physicians per 100,000 people (3.29 per 1,000) (USCB, 2008b).

50 mi (80 km) Comparative Geographic Area

In 2003, the U.S. Census Bureau determined that the Scranton-Wilkes-Barre MSA had 1,404 doctors, or 254 physicians for every 100,000 persons. There also were 14 community hospitals with 2,140 beds, or 387 beds for every 100,000 persons in the MSA (USCB, 2006l).

There are 11 hospitals in the ROI: Geisinger South Wilkes-Barre in Wilkes-Barre, Geisinger Wyoming Valley Medical Center in Wilkes-Barre, Hazleton General Hospital in Hazleton, Wyoming Valley Health Care System-Hospital Inc in Wilkes-Barre, First Hospital Wyoming Valley in Wilkes-Barre, John Heinz Institute of Rehabilitation in Wilkes-Barre, Kindred Hospital - Wyoming Valley, Mercy Special Care Hospital in Nanticoke, VA Medical Center - Wilkes-Barre, Berwick Hospital Center in Berwick, and Bloomsburg Hospital in Bloomsburg (PADOH, 2008). These facilities and other medical services are described below.

2.5.2.9.6.1 Luzerne County

Luzerne County has nine hospitals, Geisinger South Wilkes-Barre, Geisinger Wyoming Valley Medical Center, Hazleton General Hospital, Wyoming Valley Health Care System-Hospital Inc, First Hospital Wyoming Valley, John Heinz Institute of Rehabilitation, Kindred Hospital - Wyoming Valley, Mercy Special Care Hospital, and VA Medical Center - Wilkes-Barre.

Geisinger South Wilkes-Barre (GSWB) is a non-governmental, general acute care hospital with Joint Commission on Accreditation of Healthcare Organizations (JCAHO) accreditation (PADOH, 2008) (JC, 2008). Geisinger acquired South Wilkes-Barre in December 2005. Originally opened in 1898, GSWB is a fully accredited hospital licensed for 210 beds, including 20 skilled nursing beds, 10 adolescent psychiatry beds, and 180 medical-surgical beds. GSWB offers a wide range of services, including a 24-hour-a-day emergency room, a fully accredited sleep disorders center, and a heart center that features comprehensive diagnostics, cardiac catheterization, surgical, and cardiac rehabilitation services (Geisinger, 2006). There were 3,642 admissions, with an average length of stay of 5.33 days in 2005-2006 (PADOH, 2008).

Geisinger Wyoming Valley Medical Center (GWV) is a non-governmental, general acute/tertiary care hospital with JCAHO accreditation (PADOH, 2008) (JC, 2008). Geisinger Wyoming has 177 acute care licensed beds with 148 beds set up and staffed in 2005-2006. There were 8,975 admissions, with an average length of stay of 4.44 days in 2005-2006 (PADOH, 2008). GWV provides comprehensive healthcare services including pediatrics, sleep disorders, cardiology orthopedics, and cancer care. The GWV emergency department offers fast-track care for those patients not requiring full trauma treatment (Geisinger, 2006).

Hazleton General Hospital is a non-governmental, general acute care hospital with JCAHO accreditation (PADOH, 2008) (JC, 2008). Hazleton General has 150 acute care licensed beds with 120 beds set up and staffed in 2005-2006. There were 6,886 admissions, with an average length of stay of 5.2 days in 2005-2006 (PADOH, 2008). Hazleton General underwent an $18 million construction and renovation project from 2005 to 2006, which included a two-story Annex building constructed at the back of the hospital to house a new, state-of-the-art laboratory, medical records department, medical library, physician staff office and lounge, quality management and administrative offices. A Step-Down Unit was also constructed to serve patients who were transitioning from the Intensive Care Unit. The Emergency Department was expanded to double its size to better accommodate the growing community population in one central location. The hospital also formed a partnership with Lehigh Valley Hospital to provide physician staffing to the new Emergency Department, allowing Hazleton Hospital to have access to specialists and technologies only found at larger medical facilities. A new Surgical Suite and Short Procedure Unit rounded out major medical service renovations and expansions within the hospital. The hospital constructed a 72,000 ft^2 (6689 m^2 m2) Health & Wellness Center in 2005 (GHHA, 2008).

Wyoming Valley Health Care System-Hospital, Inc (WVHCS) is a non-governmental, general acute care hospital with JCAHO accreditation (PADOH, 2008) (JC, 2008). WVHCS had 412 acute care licensed beds, with 333 beds set up and staffed in 2005-2006. The hospital also has a longterm care unit. There were 17,926 admissions, with an average length of stay of 4.87 days (PADOH, 2008).

First Hospital Wyoming Valley is a non-governmental, specialty care hospital with JCAHO accreditation (PADOH, 2008) (JC, 2008). The hospital had 96 licensed beds set up and staffed in 2005-2006. There were 3,030 admissions, with an average length of stay of 8.71 days (PADOH, 2008).

John Heinz Institute of Rehabilitation is a non-governmental, specialty care hospital with JCAHO accreditation (PADOH, 2008) (JC, 2008). The hospital had 94 licensed beds set up and staffed in 2005-2006. There were 2,007 admissions, with an average length of stay of 13.2 days (PADOH, 2008).

Kindred Hospital - Wyoming Valley is a non-governmental, specialty care hospital with JCAHO accreditation (PADOH, 2008) (JC, 2008). The hospital had 36 acute care licensed beds set up and staffed in 2005-2006. There were 369 admissions, with an average length of stay of 25.21 days (PADOH, 2008).

Mercy Special Care Hospital is a non-governmental, long-term acute care hospital and had 67 acute care licensed beds set up and staffed in 2005-2006. There were 631 admissions, with an average length of stay of 28.28 days (PADOH, 2008).

VA Medical Center - Wilkes-Barre is a federal general care hospital with JCAHO accreditation (PADOH, 2008) (JC, 2008). The VA Medical Center serves 19 counties in Pennsylvania and one county in New York. The Wilkes-Barre VA Medical Center is a general medical and surgical facility consisting of 79 operating hospital beds, 105 operating nursing home beds, and 10 substance abuse residential rehabilitation treatment program beds (USDVA, 2008). There were 2,410 admissions, with an average length of stay of 6.35 days (PADOH, 2008).

In addition to the above hospitals, Luzerne County has 26 nursing homes with 2,912 licensed/ approved beds (PADOH, 2008).

In 2004, Luzerne County had 252 physicians per 100,000 people (2.52 per 1,000) and 311 beds per 100,000 people (3.11 per 1,000). The ratio of physicians and hospital beds for the population was less than the state ratios. However, the ratio of hospital beds was greater than the US ratio (USCB, 2008b).

2.5.2.9.6.2 Columbia County

Columbia County has two hospitals, Berwick Hospital Center and Bloomsburg Hospital. Berwick Hospital is a non-governmental, general acute care hospital with JCAHO accreditation. The facility has 101 acute care licensed beds and 240 long-term care licensed beds. There are 50 active physicians and 21 courtesy physicians at Berwick Hospital (BHC, 2008). Berwick Hospital had 3,326 admissions from 2005 to 2006, with an average length of stay of 4.59 days (PADOH, 2008). The Berwick Hospital Center (BHC) is staffed by 71 physicians and a total of 600 hospital employees. Approximately, 101 acute care and 240 long-term care licensed beds are available (BHC, 2008). Bloomsburg Hospital is non-governmental, general acute care hospital and has 72 acute care licensed beds. There were 3,161 admissions with an average length of stay of 3.55 days (PADOH, 2008).

In addition to the above hospitals, Columbia County has five nursing homes with 685 licensed/ approved beds (PADOH, 2008).

In 2004, Columbia County had 156 physicians per 100,000 people (1.56 per 1,000) and 630 beds per 100,000 people (6.30 per 1,000). The ratio of physicians was less than the state ratio. However, the ratio of hospital beds was greater than the state and US ratios (USCB, 2008b).

2.5.2.11 References

CCS, 2009. Securing a Future of Excellence Together, Website accessed on April 14, 2009, http://centralcountysafet.com/5.html.

Kaiser, 2007. Henry Kaiser Family Foundation (Kaiser), 2007. Statehealthfacts.org. Pennsylvania State. Website accessed on July 17, 2009, http://www.statehealthfacts.org/profileind.jsp?cat=8&sub=94&rgn=40.

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

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

Luzerne County, 2008. Luzerne County Trails. Website accessed on August 7, 2009, http://www.luzernecounty.org/county/departments_agencies/recreation/trails.

PAFBC, 2009. Pennsylvania Fish and Boat Commission (PAFBC), 2009. Water Trail Guides. Website accessed on July 22, 2009, http://www.fish.state.pa.us/watertrails/trailindex.htm#8.

PSP, 2007. Pennsylvania State Police (PSP), 2007. 2007 Crime in Pennsylvania Annual Uniform Crime Report. Website accessed on August 4, 2009, http://ucr.psp.state.pa.us/UCR/Reporting/Annual/AnnualFrames.asp?year=2007

RTTC, 2009. Rails to Trails Conservancy (RTTC), 2009. General Search Engine for Trails within 50 Miles of Berwick, PA. Website accessed on July 22, 2009, http://www.traillink.com/TrailSearch.aspx?tn=&st=PA&ct=Berwick&sp=N.

STHPLC, 2009. Steps To A Healthier PA Luzerne County, Website accessed on April 9, 2009, http://www.stepstoahealthierluzernecounty.org.

USCB, 2008a. Annual New Privately-Owned Residential Building Permits for 2000-2006, Luzerne and Columbia County, Pennsylvania, U.S. Census Bureau, Website: http://censtats.census.gov/bldg/bldgprmt.shtml, Date accessed: April 2, 2008.

USCB, 2008b. 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. Williams, Richard L. and Peter T. 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. Illinois Periodicals Online Feature Article. March/April 1997. Website accessed on August 7, 2009, http://www.lib.niu.edu/1997/ip970317.html.

SE 4.4-11

ESRP 4.4.2

Summary: *Please provide data to support the statement that sufficient capacity is available to meet the additional demands placed upon public services by the construction workforce, including comparisons of demands for public services generated by the construction workforce against capacity and utilization rates for police and fire services and educational services.*

Full Text: None

Response:

Police Services

As presented in the response to BBNPP ER RAI SE 2.5-8, the following table provides a summary of the existing number of police officers in Luzerne and Columbia counties, as well as the number of officers that could be needed when the BBNPP is constructed. It also includes the number of officers that might be needed within the counties, based upon an accepted national standard of 1.5 officers per 1,000 people (Layton and Gloo, 2007).

Current and Potential Needs for Police Officers, Luzerne and Columbia Counties

County	Number of Current Police Officers	Needed* in 2006	Needed* with Project
Luzerne County	550	469.5	473.6
Columbia County	106	97.5	101.8

*Based upon a national standard of 1.5 officers per 1,000 people.

As shown in this table, both Luzerne and Columbia counties currently have enough police officers for their populations. They also would have enough officers without additional hires if the total in-migrating population during construction were to locate to these counties.

Fire Services

As presented in the response to BBNPP ER RAI SE 2.5-8, the following table provides a summary of the existing number of firefighters in Luzerne and Columbia counties, as well as the number of firefighters that potentially would be needed when the BBNPP is being constructed. It also includes the number of firefighters that are needed within the counties, based upon an accepted national standard of 1.0 firefighter per 1,000 people (CCS, 2009).

Current and Potential Need for Firefighters, Luzerne and Columbia Counties

County	Current Number of Firefighters	Needed* in 2006	Needed* with Project
Luzerne County	2,391	313	316
Columbia County	967	65	68

*Based on a national standard of 1.0 firefighter per 1,000 people.

As shown in this table, both Luzerne and Columbia counties currently have enough firefighters for their population. They also would have enough firefighters without additional hires if the total in-migrating population during construction were to locate to these counties.

Recreational Sites

As presented in the response to BBNPP ER RAI SE 2.5-8, universal standards are not available to identify the "appropriate" amount of recreational facilities within an area. A standard has been in place since 1981 that suggests 10 acres of parkland are required for every 1,000 people. This standard, however, has been cited as deficient for the way in which recreation and open space works today. A systems approach is now suggested, which incorporates aspects of level of service rather than acreage (Williams and Dyke, 1997).

Using the acreage of the four state parks alone (22,183 acres), the existing ratio for the ROI is 58.7 acres per 1,000 people, which is much greater than the standard for 10 acres for every 1,000 people. 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.

In addition, according to a Rickett's Glen State Park representative, average annual visitor numbers are approximately 750,000 to 800,000. The representative indicated that the Park could easily handle an additional 3,000 people and did not anticipate any impacts associated with the construction and operation of the facility, or any changes required in staffing or facilities at the park.

Water/Sewer and Sewage Services

As presented in the response to BBNPP ER RAI SE 2.5-8, the following table provides a summary of the current water supply in Luzerne and Columbia counties, as well as the amount of water that potentially would be needed when the BBNPP is being constructed. It also includes the percentage of the existing design capacity that currently is being used and the percentage during construction.

Potential Water Supply Project Needs, Luzerne and Columbia Counties (gpd)

Water Supply	Current*	Design Capacity	Needed** for In-Migrants for the Project	Total Needed with Project	Current Percentage Used	Percentage Used with Project
Luzerne County	29,706,438	47,179,200	269,800	29,976,238	63.0	63.5
Columbia County	4,320,000	8,747,200	285,800	4,605,800	49.4	52.7
Total	34,026,438	55,926,400	555,600	34,582,038	60.8	61.8

*Based upon Average Production, excluding those for which design capacity was not available

**Based upon a standard of 100 gallons per day per capita

A second table provides information on the existing design capacity, the amount needed for the in-migrating population, and the percentage of the design capacity that would be used.

Potential Waste Water Capacity Project Needs, Luzerne and Columbia Counties (gpd)

Sewage Generated	Design Capacity*	Needed** for In-Migrants for the Project	Percentage of Total Design Capacity
Luzerne County	62,720,000	404,700	0.65
Columbia County	9,122,900	428,700	4.70
Total	71,842,900	833,400	1.16

*Based upon Average Production, excluding those for which design capacity was not available

**Based upon a standard of 150 gallons per day of waste water per capita

Medical Services

As indicated in the response to BBNPP ER RAI SE 2.5-8, Pennsylvania had 329 physicians per 100,000 people (3.29 per 1,000). In addition, the state had 323 beds per 100,000 people (3.23 per 1,000) (USCB, 2008). In 2004, Luzerne County had 252 physicians per 100,000 people (2.52 per 1,000) and 311 beds per 100,000 people (3.11 per 1,000). Columbia County had 156 physicians per 100,000 people (1.56 per 1,000) and 630 beds per 100,000 people (6.30 per 1,000).

The following table provides a summary of the current and projected need with the BBNPP project for hospital beds and physicians within Luzerne and Columbia counties:

Current and Potential Hospital Bed and Physician Needs, Luzerne and Columbia Counties

	Number of Beds/ Physicians in 2006	Current Ratio Per 1,000 People	State Ratio	US Ratio	Number of Beds/ Physicians Needed** in 2006	Ratio with Project	Number of Beds/ Physicians Needed** with Project
Number of Hospital Beds*			3.23	2.70			
Luzerne County	973.49	3.11			1,011.05	3.08	1,019.77
Columbia County	409.59	6.30			210.00	6.04	219.23
Number of Physicians*			3.29	n/a			
Luzerne County	788.81	2.52			1,029.84	2.50	1,038.71
Columbia County	101.42	1.56			213.90	1.49	223.30

*Based upon United States Census Data for 2004

**Based upon the state ratio

Educational Services

Refer to the response to BBNPP ER RAI SE 4.4-13 for information about School Capacity, Student to Teacher Ratios, and Mitigation Measures.

References Cited in Response:

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.

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

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.

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

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

COLA Impact:

BBNPP COLA ER will be revised as follows in a future revision of the COLA:

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. ~~Although an increase in population levels from the BBNPP construction workforces could place additional demands on area doctors and hospitals, with nine hospitals in Luzerne County and another two hospitals in Columbia County (Section 2.5.2) it appears that the two county ROI has enough capacity to accommodate the increased demand, and impacts from construction of the BBNPP facility would likely be SMALL.~~ No impacts would occur to area political and social structures. ~~However, the increased population levels could place some additional daily demands on constrained police services, fire suppression and EMS services, and schools. Impacts to these services are discussed below.~~ 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. ~~Luzerne County has 68 career and volunteer fire departments with 87 fire stations and 2,391 active firefighters, and Columbia County has 23 fire departments with 27 stations and 967 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 ~~Existing fire and law enforcement~~ services in Luzerne County and Columbia County appear to be adequate to meet current daily needs within their jurisdictions. As previously 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 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.

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 2.5-28 (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 ER 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 2.5-30. 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

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

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

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.

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.

SE 4.4-13

ESRP 4.4.2

Summary: *Provide an estimate of impacts on school capacity/percentage of use and list potential mitigation measures.*

Full Text: None.

Response:

Capacity

Refer to the response to RAI SE 2.5-7, which provides information about the capacity of the local school districts within the vicinity of the BBNPP in Luzerne and Columbia counties. It includes information obtained from interviews with district offices, as well as data available from public sources.

Student to Teacher Ratios

Refer to the response to RAI SE 2.5-7, which provides information about the existing student to teacher ratios for both public and private schools in Luzerne and Columbia counties. It includes information obtained from interviews with district offices, as well as data available from public sources.

Mitigation Measures

Based upon the additional information provided in the response to RAI SE 2.5-7, PPL believes that the assessment in Rev 1 of COLA ER Section 4.4.2.8 is appropriate for Luzerne County. The percentage increase in student enrollment from in-migration among schools within the county and local towns would be small relative to the existing student enrollment. Additional tax revenues would provide funding to meet potential new project-related impacts to Luzerne County school systems and, as a result, the impact in Luzerne County would be SMALL (see ER Section 4.4.2.8) and no additional mitigation would be required.

Because the influx of students from new households would be 4.6% to 8% of total school enrollment and communities within Columbia County would not receive direct tax benefits from the construction of BBNPP, it is estimated that the impacts on Columbia County schools would be MODERATE, and may require additional mitigation. However, any additional mitigation that might be required, such as the installation of modular/temporary classrooms, the renovation or reconfiguration of existing classroom space, or the retention of additional teaching staff, would likely be associated with those Columbia County communities in closest proximity to BBNPP, which are served primarily by the Berwick Area School District. As discussed in COLA ER 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.

COLA Impact:
BBNPP COLA ER Section 4.4.2.8 will be revised as follows in a future revision of the COLA:

4.4.2.8 Public Services

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 ~~public school system~~. 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), ~~it~~ 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. ~~Because there would be some additional demands placed on the Columbia County Public School System, the impacts of the power plant would be MODERATE and some additional mitigation might be required.~~ 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 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.

TE 2.4-1

ESRP 2.2.1

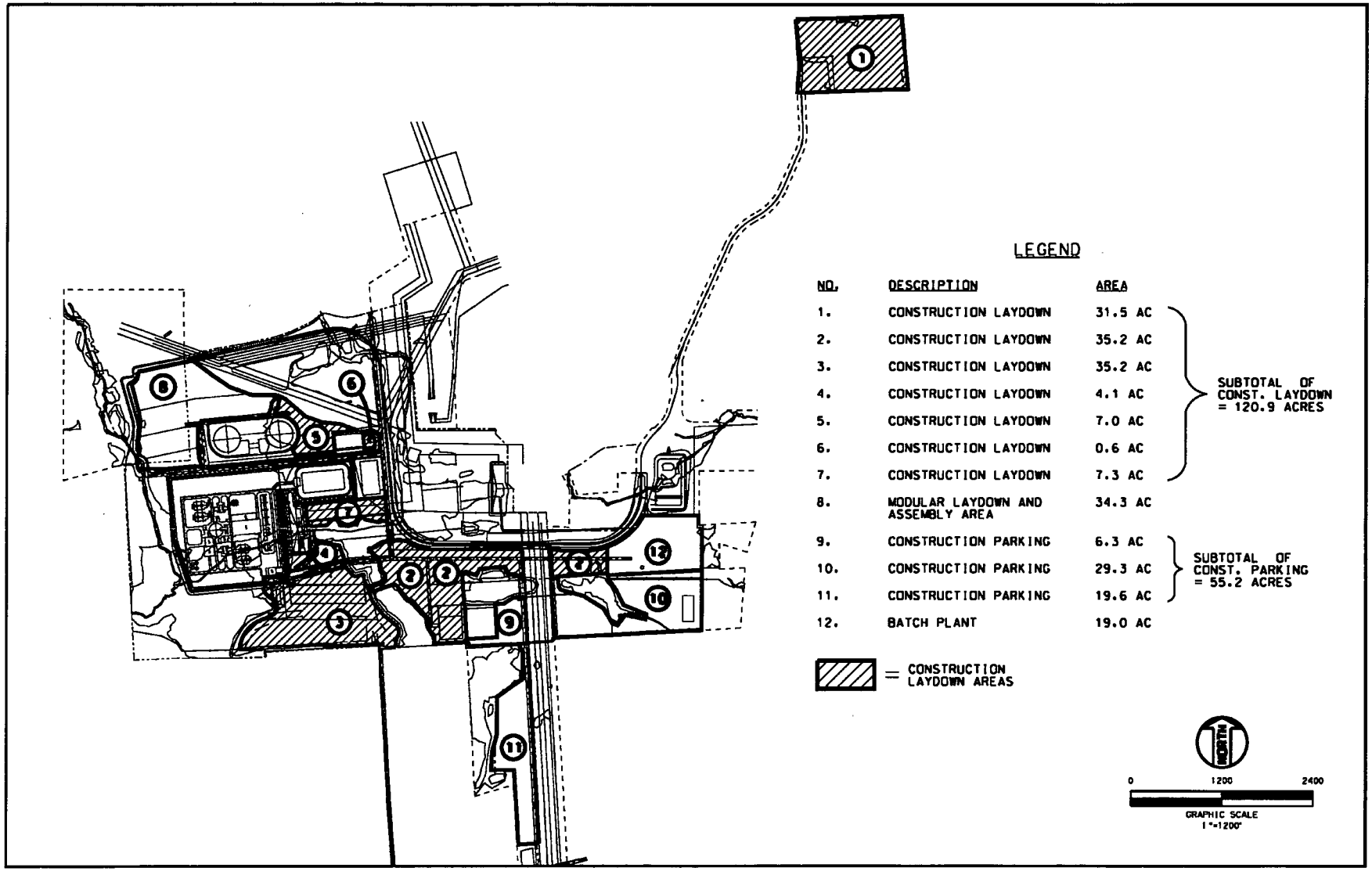
Summary: *Identify the location of all lay-down areas in Figure 2.1-1, "BBNPP Site and Proposed New Plant Layout", or provide a new figure to show the location of these features.*

Full Text: None.

Response: The response to this RAI was provided to the NRC in Bell Bend letter BNP-2009-217, dated August 10, 2009. In a recent teleconference, the NRC indicated that the legend for ER Figure 2.1-5, "Area Uses During Construction" was difficult to read. PPL has increased the size of the legend in order to improve legibility.

COLA Impact:
The COLA impact was provided in Bell Bend letter BNP-2009-217, dated August 10, 2009. The following improved figure will be utilized as ER Figure 2.1-5 in a future revision of the COLA:

Figure 2.1-5 Area Uses During Construction



Enclosure 3

RAI RHH 4.5-2 Data Files
Bell Bend Nuclear Power Plant
Luzerne County Pennsylvania
(Compact Disc)

Enclosure 4

RAI STO 1-1 References
Bell Bend Nuclear Power Plant
Luzerne County Pennsylvania
(Digital Video Disc)