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September 17, 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, FOURTH SUBMITTAL
BNP-2009-266 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-2009-217, dated September 11, 2009. These RAIs are identified with a footnote in Enclosure 1.

PPL plans to continue 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 17 RAIs. 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 Susquehanna River withdrawal data in an MS Excel file format as well as portable document format (pdf) in support of the response to RAI H 2.3-1. Enclosure 4 contains Susquehanna Steam Electric Station/Susquehanna River Basin Commission extended power uprate files that also support the RAI H 2.3-1 response. Enclosure 5 contains Pennsylvania Department of Environmental Protection data, in MS Excel format and pdf, on water withdrawals in support of the RAI H 2.3-2 response.

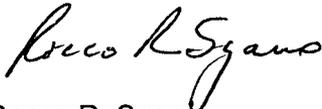
DOTA
NRO

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 September 17, 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 H 2.3-1, Susquehanna River Withdrawal Data, (MS Excel & Portable Document Format), Luzerne County Pennsylvania, (One Compact Disc)
 - 4) RAI H 2.3-1, Susquehanna Steam Electric Station/Susquehanna River Basin Commission, Extended Power Uprate Files, Luzerne County Pennsylvania
 - 5) RAI H 2.3-2, PADEP Water Withdrawal Data, Luzerne County Pennsylvania, (One Compact Disc)

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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		
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	September 25, 2009 ¹
ACC 7.2-6	ESRP 7.2	Submitted August 10, 2009
ACC 7.3-1	ESRP 7.3	Included in Enclosure 2
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	September 25, 2009 ¹
ACC 7.3-5	N/A	Submitted August 10, 2009
MET 2.7-1	ESRP 2.7	October 16, 2009 ¹
MET 2.7-2	ESRP 2.7	September 25, 2009 ^{1,2}
MET 2.7-3	ESRP 2.7	Submitted September 11, 2009
MET 2.7-4	ESRP 2.7	Included in Enclosure 2
MET 5.3-1	ESRP 2.7, ESRP 5.3.3.1	September 25, 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	Included in Enclosure 2
MET 6.4-2	ESRP 6.4	Included in Enclosure 2
ALT 9.3-1	ESRP 9.3	September 25, 2009 ^{1,2}
ALT 9.3-2	ESRP 9.3	September 25, 2009 ¹
ALT 9.3-3	ESRP 9.3	Submitted September 11, 2009
ALT 9.3-4	ESRP 9.3	September 25, 2009 ¹
ALT 9.3-5	ESRP 9.3	September 25, 2009 ¹
AE 2.3-1	ESRP 2.3.1	September 25, 2009 ¹
AE 2.3-2	ESRP 2.3.1	Submitted August 5, 2009
AE 2.3-3	ESRP 2.3.1	September 25, 2009 ¹
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	September 25, 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, 2010 ¹
AE 4.3-3	ESRP 4.3.2	September 25, 2009 ¹
AE 4.3-4	ESRP 4.3.2	September 25, 2009 ¹
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	September 25, 2009 ¹
AE 9.3-2	ESRP 9.3	Included in Enclosure 2
AE 9.3-3	ESRP 9.3	Included in Enclosure 2
AE 9.3-4	ESRP 9.3	September 25, 2009 ¹
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 (continued)		
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	September 25, 2009 ^{1,2}
CR 2.5-7	ESRP 4.1.3, ESRP 5.1.3	September 25, 2009 ¹
CR 2.5-8	ESRP 4.1.3, ESRP 5.1.3	September 25, 2009 ¹
STO 1-1	N/A	September 25, 2009 ¹
STO 2.1-1	ESRP 2.2, 2.4, 2.5, and 4.3	September 25, 2009 ¹
STO 2.1-2	ESRP 2.1	Submitted August 10, 2009
STO 2.2-1	ESRP 2.2	Included in Enclosure 2
STO 2.3-1	ESRP 2.3	September 25, 2009 ¹
GEO 2.6-1	ESRP 2.6	Submitted September 11, 2009
H 2.3-1	ESRP 2.3-2	Included in Enclosure 2
H 2.3-2	ESRP 2.3-2	Included in Enclosure 2
H 3.4-1	ESRP 3.4.1	September 25, 2009 ¹
H 3.6-1	ESRP 3.6.1	Included in Enclosure 2
H 3.6-2	ESRP 3.6.1	Submitted August 5, 2009
H 4.2-1	ESRP 4.2.1	September 25, 2009 ^{1,2}
H 5.2-1	ESRP 5.2.2	September 25, 2009 ¹
H 5.3-1	ESRP 5.3.2.1	September 25, 2009 ^{1,2}
H 6.3-1	ESRP 6.3	October 12, 2009 ¹
H 9.3-1	ESRP 9.3	September 25, 2009 ¹
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 ^{1,2}
LU 4.1-1	ESRP 4.1	January 15, 2010 ^{1,2}
LU 5.1-1	ESRP 4.1	January 15, 2010 ^{1,2}
LU 5.1-2	ESRP 4.1	January 15, 2010 ^{1,2}
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	October 12, 2009 ¹
RHH 4.5-3	ESRP 4.5	September 25, 2009 ^{1,2}
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	October 12, 2009 ¹
SE 2.5-3	ESRP 2.5.2	October 12, 2009 ¹
SE 2.5-4	ESRP 2.5.2	September 25, 2009 ^{1,2}
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	September 25, 2009 ^{1,2}
SE 2.5-8	ESRP 2.5.2	September 25, 2009 ^{1,2}
SE 2.5-9	ESRP 2.5.2	Submitted September 11, 2009
SE 2.5-10	ESRP 2.5.4	Included in Enclosure 2
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	Included in Enclosure 2
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	September 25, 2009 ¹
SE 4.4-4	ESRP 4.4.2	September 25, 2009 ¹
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 (continued)		
RAI	Review Plan Section	Planned Submittal Schedule
SE 4.4-7	ESRP 4.4.2	Included in Enclosure 2
SE 4.4-8	ESRP 4.4.2	Included in Enclosure 2
SE 4.4-9	ESRP 4.4.2	September 25, 2009 ¹
SE 4.4-10	ESRP 4.4.2	Included in Enclosure 2
SE 4.4-11	ESRP 4.4.2	September 25, 2009 ^{1,2}
SE 4.4-12	ESRP 4.4.2	September 25, 2009 ¹
SE 4.4-13	ESRP 4.4.2	September 25, 2009 ^{1,2}
SE 4.4-14	ESRP 4.4.3	Included in Enclosure 2
SE 5.8-1	ESRP 5.8.2	Included in Enclosure 2
SE 5.8-2	ESRP 5.8.2	Submitted August 5, 2009
CB 10.4-1	ESRP 10.4.2	September 25, 2009 ¹
TE 2.4-1	ESRP 2.2.1	Submitted August 10, 2009
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	October 16, 2009 ¹
TE 2.4-7	ESRP 2.4.1	January 15, 2010 ¹
TE 2.4-8	ESRP 2.4.1	October 16, 2009 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	October 16, 2009 ¹
TE 4.3-9	ESRP 4.3.1	September 25, 2009 ¹
TE 4.3-10	ESRP 4.3.1	January 15, 2010 ¹
TR 4.7-1	ESRP 4.7	September 25, 2009 ¹
TR 4.7-2	ESRP 4.7	Submitted August 10, 2009

USACE Response Status for Environmental Requests for Additional Information	
RAI	Planned Submittal Schedule
USACE-1	October 16, 2009 ¹
USACE-1a	September 25, 2009 ¹
USACE-1b	October 16, 2009 ¹
USACE-2	October 16, 2009 ¹
USACE-2a	October 16, 2009 ¹
USACE-2b	October 16, 2009 ¹
USACE-2c	October 16, 2009 ¹
USACE-2d	October 16, 2009 ¹
USACE-2e	October 16, 2009 ¹
USACE-2f	October 16, 2009 ¹
USACE-2g	September 25, 2009 ¹
USACE-2h	October 16, 2009 ¹
USACE-3	October 16, 2009 ¹

¹The 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.

²The planned submittal date for these RAI responses has been revised since the September 11, 2009, RAI response submittal.

Enclosure 2

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

ACC 7.3-1ESRP 7.3

Summary: *Provide a justification for why only the top 50% contributing cutsets of CDF were evaluated in the ER.*

Full Text: The ER states that only the “top 100 cutsets that “represent the approximately 50% of the total CDF ... were evaluated.” Justify how looking at the cutsets that contribute only 50% of the CDF establishes that all possible design alternatives for the US EPR were addressed. In addition, discuss why large release frequency (LRF) cutsets were not evaluated to establish alternatives.

Response:Evaluation of Level 1 PRA

The evaluation of the top 100 Level 1 PRA cutsets is appropriate to identify plant-specific modifications for inclusion in the comprehensive list of Severe Accident Mitigation Design Alternatives (SAMDA) candidates, because:

- All significant cutsets are included in the top 100 CDF cutsets. “Significant” is defined in Regulatory Guide 1.200 as greater than one percent or collectively contributing ninety-five percent to the CDF. As stated in the U.S. EPR FSAR Section 19.1.4.1.2.3 (Significant Cutsets and Sequences), ninety-five percent of the total CDF is represented by over 12,000 cutsets for the U.S. EPR plant. The top 100 Level 1 cutsets include all cutsets contributing more than one percent to the total CDF and equates to approximately 50 percent of the total CDF.
- Contribution of cutsets beyond the top 100 is very small. The individual contribution to the total core damage frequency (CDF) for the 101st cutset was 0.10 percent. Individual cutsets below that point have little influence on CDF and are therefore not likely contributors for identification of cost-beneficial enhancements.

Evaluation of Level 2 PRA

In addition to the top 100 CDF cutsets, the top 100 Large Release Frequency (LRF) cutsets are also evaluated to identify plant-specific modifications that could reduce the likelihood of the dominant containment challenges.

The model used for this evaluation was developed to respond to U.S. EPR FSAR RAI 22, Question 19-160 (ML083110520). This model is the U.S. EPR FSAR Level 2 PRA model with the following LRF sequence removed: main steam line break inside of containment leading to an overcooling event, resulting in overpressure failure of the containment. This sequence of events was shown not to lead to core damage in the response to Question 19-160. Removing this sequence addresses the staff concern that the overly conservative treatment of that event would artificially reduce the relative importance of other failure modes.

The top 100 LRF cutsets include all cutsets contributing greater than one percent to the total LRF. For the U.S. EPR plant this equates to approximately 50 percent of the total U.S. EPR plant LRF. The individual contribution to the total LRF for the 101st cutset is 0.10 percent.

Examination of the top 100 LRF cutsets yielded no additional SAMDA candidates beyond those that were initially identified in Table 3-1 of the "AREVA NP Environmental Report Standard Design Certification" (ANP-10290 Rev. 0). This is due to the exhaustive nature of the original SAMDA analysis, as it identified numerous enhancements related to containment phenomena and containment bypass.

When the contribution from the containment failure due to main steam line break inside containment is removed, a clear and consistent picture emerges from the Level 2 results for internal events, fire, and flooding.

Four containment failure mechanisms can be found within the top 100 LRF cutsets:

- Early containment failure due to hydrogen flame acceleration
- Steam generator tube rupture (pressure-induced or creep-induced)
- Interfacing system LOCAs
- Containment isolation failures

Each of these phenomena is reviewed against the list of existing SAMDA candidates to evaluate if additional SAMDA would need to be considered to address these phenomena.

Hydrogen Flame Acceleration

Containment failure due to hydrogen flame acceleration appears in more than 50 of the top 100 LRF cutsets. It is a dominant contributor to LRF, contributing approximately 40 percent to internal event LRF (U.S. EPR FSAR RAI 22, Supplement 3, Table 19-160-6), and approximately 80 percent to flood and fire LRF (U.S. EPR FSAR Tables 19.1-54 and 19.1-79).

The following SAMDA candidates from Table 3-1 of the ANP-10290 Rev. 0 apply to containment failures due to hydrogen phenomena:

- Provide post-accident containment inerting capability (CP-07)
- Install an independent power supply to the hydrogen control system using either new batteries, a non-safety grade portable generator, existing station batteries, or existing AC/DC independent power supplies, such as the security system diesel (CP-19)
- Install a passive hydrogen control system (CP-20)

Steam Generator Tube Rupture (SGTR)

Containment bypass due to SGTR appears in approximately 40 of the top 100 LRF cutsets.

Initiating events "SGTR" and "Induced SGTR" (i.e., pressure-induced tube ruptures prior to core damage) are a dominant contributor to LRF, contributing almost half of the internal event LRF (Response to U.S. EPR FSAR RAI 22, Supplement 3, Table 19-160-5).

The following SAMDA candidates from Table 3-1 of the ANP-10290 Rev. 0 apply to containment bypass due to steam generator tube rupture:

- Institute maintenance practice to perform a 100% inspection of steam generator tubes during each refueling outage (CB-09)
- Replace steam generator with a new design (CB-10)
- Increase the pressure capacity of the secondary side so that an SGTR would not cause the relief valves to lift (CB-11)
- Provide improved instrumentation to detect SGTRs, such as Nitrogen-16 monitors (CB-14)
- Route the discharge from the main steam safety valves (MSSV) through a structure where a water spray would condense the steam and remove most of the fission products (CB-15)
- Install a highly reliable (closed loop) SG shell-side heat removal system that relies on natural circulation and stored water sources (CB-16)
- Revise emergency operating procedures (EOPs) to direct isolation of a faulted SG (CB-17)
- Direct SG flooding after an SGTR, prior to core damage (CB-18)
- Vent MSSVs in containment (CB-19)

Creep-induced steam generator tube ruptures during severe accident sequences at high pressure contribute approximately 17 percent to LRF (U.S. EPR FSAR Tables 19.1-50 and 19.1-75). The following SAMDA candidates from Table 3-1 of ANP-10290 Rev. 0 deal specifically with reducing primary system pressure during severe accident sequences, which is the preferred method for arresting the mechanism of induced steam generator tube rupture during high pressure core damage sequences:

- Install a redundant spray system to depressurize the primary system during an SGTR (CB-12)
- Proceduralize use of pressurizer vent valves during SGTR sequences (CB-13)

Interfacing System LOCA

ISLOCAs appear in four of the top 100 LRF cutsets and are a small contributor to LRF, approximately 3 percent of the internal events LRF (Response to U.S. EPR FSAR RAI 22, Supplement 3, Table 19-160-2).

The following SAMDA candidates from Table 3-1 of the ANP-10290 Rev. 0 address the issues associated with interfacing system LOCA:

- Install additional pressure or leak monitoring instruments for detection of interfacing system loss of coolant accidents (ISLOCA) (CB-01)
- Increase leak testing of valves in ISLOCA paths (CB-03)
- Locate residual heat removal (RHR) inside containment (CB-05)
- Ensure that ISLOCA releases are scrubbed. One method is to plug drains in potential break areas so that break point will be covered with water (CB-06)
- Revise EOPs to improve ISLOCA identification (CB-07)
- Improve operator training on ISLOCA coping (CB-08)
- Install relief valves in the component cooling water system (CB-20)

Containment Isolation Failure

Containment isolation failures appear in four of the top 100 LRF cutsets and are a small contributor to LRF. Response to U.S. EPR FSAR RAI 22, Supplement 3, Table 19-160-2 and

U.S. EPR FSAR Tables 19.1-50 and 19.1-75 show that the containment isolation failures account for about 8 percent of LRF for internal events, 5 percent of LRF from flooding events, and 2 percent of LRF for fire events.

The following SAMDA candidates from Table 3-1 of the ANP-10290 Rev. 0 address containment isolation failure.

- Add redundant and diverse limit switches to each containment isolation valve (CB-02)
- Install self-actuating containment isolation valves (CB-04)

Conclusion

When evaluating the top 100 LRF cutsets no additional SAMDA candidates were identified. Therefore, the list of SAMDA candidates provided in Table 3-1 of ANP-10290 Rev. 0 is a comprehensive list of SAMDA candidates for the U.S. EPR plant.

COLA Impact

BBNPP COLA ER Section 7.3.1 will be revised as follows in a future revision of the COLA:

7.3.1 SAMDA ANALYSIS METHODOLOGY

The methodology used to develop a comprehensive list of U.S. EPR SAMDA candidates, define the screening criteria used to categorize the SAMDA candidates, and the cost-benefit evaluation is summarized in this section based on the U.S. EPR DC ER (AREVA, 2007) for the U.S. EPR.

The comprehensive list of SAMDA candidates was developed for the U.S. EPR by reviewing industry documents for generic PWR enhancements and considering plant-specific enhancements. The SAMDA candidates were defined as enhancements to the U.S. EPR plant that have the potential to prevent core damage and significant releases from the containment. The primary industry document supporting the development of U.S. EPR generic PWR SAMDA candidates was NEI 05-01 (NEI, 2005).

~~The top 100 U.S. EPR Level 1 PRA cutsets were evaluated to identify plant-specific modifications for inclusion in the comprehensive list of SAMDA candidates. The top 100 cutsets represent approximately 50 percent of the total core damage frequency (CDF) for the U.S. EPR. The percentage of contribution to the total CDF for the cutsets below the top 100 was minimal. Therefore, these cutsets were not likely contributors for identification of cost beneficial enhancements for the U.S. EPR design.~~

~~An extensive evaluation of the top 100 cutsets was completed in order to establish that all possible design alternatives for the U.S. EPR were addressed. Through the evaluation, numerous U.S. EPR specific operator actions and hardware-based SAMDA candidates were developed. The U.S. EPR DC ER (AREVA, 2007) provides a detailed list of the SAMDA candidates for the U.S. EPR. The SAMDA candidates identified in the U.S. EPR DC ER are applicable to BBNPP.~~

In addition to the generic SAMDA candidates, the results of the Level 1 and Level 2 PRA were reviewed to identify plant-specific modifications for inclusion in the comprehensive list of SAMDA candidates.

The U.S. EPR top 100 core damage frequency (CDF) cutsets were evaluated to identify those modifications that would reduce the likelihood of occurrence of the significant core damage sequences. As stated in the U.S. EPR FSAR Section 19.1.4.1.2.3 (Significant Cutsets and Sequences), ninety-five percent of the total CDF is represented by over 12,000 cutsets for the U.S. EPR; however, the top 100 cutsets include all cutsets contributing >1 percent to the total CDF. For the U.S. EPR application, this equates to approximately 50 percent of the total CDF. In fact the selection of the top 100 cutsets conservatively includes cutsets of low importance. For example, the percentage of the individual contribution to the total CDF for the 101st cutset was 0.10 percent.

The U.S. EPR top 100 large release frequency (LRF) cutsets were evaluated to identify those modifications that would reduce the likelihood of occurrence of the significant containment challenges. This population of cutsets specifically excluded the contribution to LRF of the core damage sequences due to Main Steam Line Break (MSLB) inside containment with main feedwater unisolated, as this sequence of events was determined not to lead to core damage or LRF. This exclusion ensures that the conservative treatment of an event does not artificially reduce the importance of other containment failure mechanisms. The top 100 LRF cutsets include all cutsets contributing greater than 1 percent to the total LRF. For the U.S. EPR application this equates to approximately 50 percent of the total LRF, and includes many low importance cutsets that contribute only 0.10 percent to the total LRF.

Consistent with current regulatory guidance and industry practice, the risk significant design alternatives for the U.S. EPR have been addressed by detailed evaluations of the top 100 CDF and LRF cutsets to identify plant-specific modifications for inclusion in the comprehensive list of U.S. EPR SAMDA candidates. Through the evaluation of the top 100 Level 1 PRA cutsets, numerous U.S. EPR specific operator actions and hardware-based SAMDA candidates were developed. When evaluating the top 100 LRF cutsets no additional SAMDA candidates were identified. The U.S. EPR DC ER (AREVA, 2007) provides a detailed list of the SAMDA candidates for the U.S. EPR. The SAMDA candidates identified in the U.S. EPR DC ER are applicable to BBNPP.

The SAMDA candidates developed for the U.S. EPR design were qualitatively screened using seven categories. The intent of the screening is to identify the candidates for further risk-benefit calculation. For each SAMDA candidate, a screening criteria and basis for screening was identified to justify the implementation or exclusion of the SAMDA candidate in the U.S. EPR. The seven categories used during the screening process included:

- Not applicable. The SAMDA candidates were identified to determine which are definitely not applicable to the U.S. EPR. Potential enhancements that are not considered applicable to the U.S. EPR are those developed for systems specifically associated with boiling water reactors (BWR) or with specific PWR equipment that is not in the U.S. EPR design.
- Already implemented. The SAMDA candidates were reviewed to ensure that the U.S. EPR design does not already include features recommended by a particular SAMDA candidate. Also, the intent of a particular SAMDA candidate may have been fulfilled by another design feature or modification. In these cases the SAMDA candidates are already implemented in the U.S. EPR plant design. If a SAMDA candidate has already been implemented at the plant, it is not retained.

- Combined. If one SAMDA candidate is similar to another SAMDA candidate, and can be combined with that candidate to develop a more comprehensive or plant-specific SAMDA candidate, only the combined SAMDA candidate is retained for screening.
- Excessive implementation cost. If a SAMDA candidate requires extensive changes that will obviously exceed the maximum benefit even without an implementation cost estimate and therefore incurs an excessive implementation cost, it is not retained.
- Very low benefit. If a SAMDA candidate is related to a non-risk significant system for which change in reliability is known to have negligible impact on the risk profile, it is deemed to have a very low benefit and is not retained.
- Not required for design certification. Evaluation of any potential procedural or surveillance action SAMDA candidates are not appropriate until the plant design is finalized and the plant procedures are being developed. Therefore, if a SAMDA candidate is related to any of these enhancements, it is not retained for this analysis.
- Considered for further evaluation. If a particular SAMDA candidate was not categorized by any of the preceding categories, then the SAMDA candidate is considered for further evaluation and subject to a cost-benefit analysis.

The screening categories were chosen based on guidance from NEI 05-01, Revision A. The U.S. EPR DC ER contains a detailed description of each of the categories. The screening categories are applicable to BBNPP.

After the screening process was completed, the SAMDA candidates that were placed in the Considered for Further Evaluation category would require a cost-benefit evaluation. The cost-benefit evaluation of each SAMDA candidate would determine the cost of implementing the specific SAMDA candidate with the maximum averted cost risk from the implementation of the specific SAMDA candidate. The maximum averted cost risk, typically referred to as the maximum benefit, equates to the cost obtained by the elimination of all severe accident risk.

MET 2.7-4**ESRP 2.7**

Summary: *Provide a description of how the recirculation correction factor (RCF) values listed in Table 2.7-128 were calculated and how the values are used in the AEOLUS3 model for calculating relative concentration and deposition from normal operations.*

Full Text: In accordance with ESRP 2.7, the NRC staff has a confirmatory role in evaluating relative concentration and deposition estimates for routine releases to the atmosphere. In Section 2.7.6.1.1 of the ER, site-specific recirculation correction factors (RCFs) were developed and used in calculating relative concentration and deposition estimates. NRC staff intends to verify the applicability and appropriateness of the RCFs used in this analysis. Therefore, provide documentation on how the RCFs were calculated for the BBNPP site and how the values are used within the AEOLUS3 model.

Response: Recirculation correction factors are calculated as the ratio between the χ/Q values calculated by two methods: the first takes into account the effects of changing wind speed, direction, and stability with time, and the second does not. The two codes used to determine site-specific recirculation correction factors for BBNPP were MESODIF-II and XOQDOQ, respectively.

AEOLUS3 allows the user to input site-specific recirculation correction factors as part of the receptor data. The site-specific recirculation correction factors are applied to the dispersion and deposition parameters as multipliers.

COLA Impact:

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

MET 6.4-1ESRP 2.7ESRP 6.4

Summary: *The SSES meteorological tower is within five obstruction heights of the existing SSES cooling towers. In Section 6.4.1.6 of the ER, a study is mentioned that concludes the cooling towers' effect on wind speed measurements is minimal. Provide the details of the study and explain the reasons for the conclusion that "the impact of the cooling towers on wind speed measurements is minimal and the effect on wind direction measurements is nearly non-existent."*

Full Text: ESRP 2.7 and 6.4 states that for "no discernable influence on measurements, towers should be located at least ten obstruction heights away from major obstructions. For towers located more than five obstruction heights away from major obstructions, the influence should be minimal." The SSES meteorological tower is within five obstruction heights of the SSES cooling towers. In Section 6.4.1.6 of the ER, a study is mentioned (but not referenced) which concludes that the cooling towers do not appreciably affect wind measurements made on the SSES meteorological tower. Provide justification for this conclusion.

Response: A study was performed to determine the effects of the presence of plant structures on the meteorological measurements at the Susquehanna Steam Electric Station (PPL, 2009). The structures included were the cooling towers, turbine building, reactor building, control building, and the radwaste building. The study examined the differences between windfields generated by a model when the structures were absent and present. Results indicated that the impact of plant structures on the measured wind speed was minimal, and the impact on the measured wind direction nearly non-existent.

In addition, the local meteorology tends to minimize the effects of plant structures on the meteorological measurements. The predominant wind direction over the last 25 years has been from the east-northeast at the 10-m level and the north-northeast at the 60-m level. The secondary wind direction peak has been from the southwest at both measurement levels. The plant structures modeled are located west to northwest of the meteorological tower. Winds from those three sectors (W, WNW, and NW) occur less than 10% of the time at the 10-m level and about 12% of the time at the 60-m level on average. When stable atmospheric conditions are considered in conjunction with wind from those three sectors, these percentages become 0.1% of the time at the 10-m level and about 0.4% of the time at the 60-m level.

Reference cited in response: BNP-2009-184, Bell Bend Nuclear Power Plant Submittal of Additional Information, from R. R. Sgarro (PPL), to Document Control Desk (NRC), dated July 30, 2009.

COLA Impact:

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

MET 6.4-2**ESRP 6.4**

Summary: *In Section 6.4.2 of the ER, the proposed operational meteorological program for the BBNPP site is described. As shown in Figure 6.4-1 of the ER, a new meteorological tower will be constructed and this tower will be within ten obstruction heights of both the existing SSES and the proposed BBNPP cooling towers, where influence to wind measurements may be possible. Provide justification that the location for the BBNPP meteorological tower is adequate for supporting operations at the BBNPP site.*

Full Text: ESRP 6.4 directs staff to evaluate the operational meteorological monitoring program. Section 6.4.2 of the ER describes the proposed operational meteorological program, which includes a new BBNPP meteorological tower. Figure 6.4-1 shows that the proposed BBNPP meteorological tower will be within ten obstruction heights of both the SSES and BBNPP cooling towers, where influence to wind measurements may be possible. Provide justification that the proposed location for the BBNPP meteorological tower is adequate for supporting operations at the BBNPP site (i.e., will be no more than minimally affected by the SSES and BBNPP cooling towers.)

Response: ESRP 2.7 and 6.4 states that for “no discernable influence on measurements, towers should be located at least ten obstruction heights away from major obstructions. For towers located more than five obstruction heights away from major obstructions, the influence should be minimal.” Information provided in ER Table 6.4-4, “Distances from the U.S. EPR Major Buildings to the BBNPP Meteorological Tower”, indicates that the new BBNPP meteorological tower will be located more than five obstruction heights away from both the existing SSES cooling towers and the proposed BBNPP cooling towers.

In addition, the local meteorology will tend to minimize the effects of plant structures on the meteorological measurements. The predominant wind direction at SSES over the last 25 years has been from the east-northeast at the 10-m level and the north-northeast at the 60-m level. The secondary wind direction peak has been from the southwest at both measurement levels. The BBNPP cooling towers will be located northwest of the BBNPP meteorological tower. Winds from that sector occur less than 4% of the time at both the 10-m and 60-m levels on average. When stable atmospheric conditions are considered in conjunction with wind from the northwest, these percentages become less than 0.1% of the time at the 10-m and 60-m levels. The SSES cooling towers are located northeast of the BBNPP meteorological tower. Winds from that sector occur about 10% of the time at both the 10-m and 60-m levels on average. When stable atmospheric conditions are considered in conjunction with wind from northeast, these percentages become less than 0.1% of the time at the 10-m and 60-m levels.

COLA Impact:

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

AE 9.3-2ESRP 9.3**Summary:** Martin's Creek Alternative Site.

Describe the nature of the river bottom at the Martin's Creek site and describe whether dredging of sediment would be needed. Describe whether or not cofferdams and excavation would be used.

Describe construction methods for the intake system versus the discharge system.

Describe any open-water ponds, creeks or other water features and direct or indirect impacts to these features by construction, including lineal feet or acreage of impacts.

Provide a discussion of whether the dwarf wedge mussel occurs in the river at the Martins Creek Site, and if it is there, the potential for impacts related to installation (including dredging) of the Circulating Water System, and the potential that the discharge plume could affect the mussel.

Provide information from the study "Dwarf Wedge Mussel (DWM) Habitat Study on the Upper Delaware" conducted by USFWS.

Provide a copy of the report documenting the T&E species at the Martins Creek Site. "EDR, 2008b. Environmental Data Resources Incorporated, Martins Creek Site Inquiry Number 2290046.27S, August 12, 2008."

Describe the Foul Rift Natural Heritage Priority Site and its relation to the proposed site.

Describe the range of the Atlantic sturgeon and shortnose sturgeon in the Delaware River and indicate whether either species has been found near the Martins Creek site.

Describe any commercial or recreational fisheries near the proposed intake/discharge areas in the Delaware River and the presence of any nuisance species (zebra mussel, Corbicula) in the area.

Describe the potential effluents from the CWS construction at Martin's Creek and Best Management Practices to manage them.

Provide any impingement or entrainment data available from the retired coal plant that would allow estimation of potential impacts from the proposed plant.

Full Text: ER Rev 1, p. 9-71 states that construction-related impacts would be similar to those at the Montour site with respect to dredging, or any other activity related to intake/discharge construction. Provide information about the Delaware River bottom to support the supposition that impacts at the Martin's Creek site would be similar to Montour. Observations made during the alternative site visit indicated that river flows were different at the intake and discharge areas. The Delaware River at the proposed discharge location is swiftly flowing with noticeable small rapids. It is likely that the river bottom here is primarily rocky and installation of the discharge would be similar to that for BBNPP. The river flow is fairly slow at the location of the proposed intake located opposite the former coal plant. The river bottom here may have

accumulated some sediment that would need dredging or excavation to install the intake system. Please describe the actual conditions.

Buckhorn Creek, which occurs on part of the site, was observed during the alternative site visit. Describe it.

The text (ER Rev 1, p. 9-71) states that there are no Federally endangered species on the Site. Later (p. 9-71), the text mentions the Federally endangered dwarf wedge mussel as occurring in the Delaware River in Warren County and discusses potential impacts to larvae because of entrainment. Explain.

PPL (and the Corps) is involved in the Dwarf Wedge Mussel study conducted by USFWS. The study was to be completed in 2008.

Assess impacts to the Foul Rift Natural Heritage Priority Site that is shown in the January 27, 2009 letter from NJ DEP to the NRC.

Identify potential construction effluents and discuss possible BMPs to manage them.

Response: The alternative site screening process described in ER Section 9.3 of the COLA has been superseded by a revised process. Using the new process, the entire alternative site evaluation has been performed again (PPL, 2009). The revised evaluation has resulted in the elimination of the Martin's Creek site as an alternative to the Bell Bend site.

Reference cited in response: (PPL, 2009) BNP-2009-257, Bell Bend Nuclear Power Plant Alternative Site Evaluation, from R. R. Sgarro (PPL), to Document Control Desk (NRC), dated September 9, 2009.

COLA Impact:

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

AE 9.3-3**ESRP 9.3****Summary:** *Sandy Bend Alternative Site*

Describe any open-water ponds, creeks or other water features and direct or indirect impacts to these features by construction, including lineal feet or acreage of impacts.

Describe the nature of the river bottom at the Sandy Bend site and describe whether dredging of sediment would be necessary. Describe whether or not cofferdams and excavation would be used.

Provide more detailed information about "ephemeral/fluctuating natural pool" community that is listed in Table 9.3-5 and the potential impacts to this community from construction and operation of a new plant.

Describe the potential impacts from construction and operation of a new plant to the three statelisted mussel species—the yellow lampmussel (S3S4), the elktoe (S4), and the triangle floater (S3S4)—named in Table 9.3-5.

Provide a copy of the report documenting the threatened and endangered species at the Sandy Bend Site. "EDR, 2008c. Environmental Data Resources Incorporated, Sandy Bend Site Inquiry Number 2290046.36S, August 12, 2008."

Describe any commercial or recreational fisheries near the proposed intake/discharge areas in the Juniata River, including any nuisance species (e.g., zebra mussel, Corbicula).

Describe the location, construction and associated impacts of any bridges that need to be built across the Juniata River for access to the plant or for relocation of the railroad.

Full Text: ER Rev 1, p. 9-75 states "There are several small ponds located on the site that may not be regulated. Any impacts to these bodies of water would need to be coordinated through USACE and the Commonwealth of Pennsylvania prior to construction activities. Therefore, the impacts to bodies of water at the site would be SMALL."

ER Rev 1, p. 9-75 states that construction-related impacts would be similar to those at the BBNPP and the Montour sites. Explain why dredging, or any other activity related to intake/discharge construction for Sandy Bend is similar to such activities at the BBNPP and Montour sites. Describe the Juniata River bottom to support the supposition that impacts would be similar to BBNPP or Montour. The river current in this area appears very slow, so it is likely that the river bottom is muddy in the area. The river bottom near shore appeared muddy.

ER Rev 1, p. 9-75 states "No federally-listed or state-listed species are located in the immediate vicinity of the site (EDR, 2008c)." Table 9.3-5 lists "ephemeral/fluctuating natural pool" as state-listed community. Table 9.3-5 also lists three mussel species that are state-listed—the yellow lampmussel (S3S4), the elktoe (S4), and the triangle floater (S3S4). Explain.

Assess whether there is a need to build two railroad bridges to accommodate the shifting of the tracks from "behind" the site to the opposite side of the Juniata River.

Assess the need to construct a bridge in the river to accommodate a new access road.

Response: The alternative site screening process described in Section 9.3 of the ER has been superseded by a revised process. Using the revised process, the entire alternative site evaluation has been performed again (PPL, 2009). The revised evaluation has resulted in the Sandy Bend site being eliminated as an alternate to Bell Bend.

Reference cited in response: (PPL, 2009) BNP-2009-257, Bell Bend Nuclear Power Plant Alternative Site Evaluation, from R. R. Sgarro (PPL), to Document Control Desk (NRC), dated September 9, 2009.

COLA Impact:

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

STO 2.2-1**ESRP 2.2**

Summary: Provide an assessment of the need for upgrading any portions of the exiting rail spur to SSES or any portions of the main line including any road crossings or bridges.

Full Text: State whether there is any need to upgrade the rail spur or mainline due to the large size of components for the U.S. EPR. If so, provide an assessment of the impacts of such an upgrade.

Response: A report is available titled "Project Report – UniStar Project Leo Transportation Study," AREVA NP Inc, June 28, 2007. The purpose of the study was to perform a high level feasibility analysis for transporting major NSSS components by rail and/or highway from the ports along the northeast coast of the United States to PPL's proposed site at the Susquehanna Nuclear Station in Salem Township, Luzerne County, Pa.

The study focused specifically on identifying potential routes that could potentially support the physical size and weight of the shop fabricated reactor pressure vessel and steam generators, and to identify specific areas or issues that will require further evaluation.

The report states that, "In recent years PPL replaced the LP Turbine rotor on Unit 2. The shipping skid was 12' wide and 15' tall and weighed 180 tons. Shipment was from Port Elizabeth, New Jersey directly to the site."

The study focused on the US EPR Reactor Pressure Vessel (RPV) and the US EPR Steam Generator (SG) because they are the largest, heaviest items that will be transported from France to the BBNPP site. The data on each piece of equipment is as follows:

US EPR Reactor Pressure Vessel Details	
Outer Diameter at Flange (without RCS Nozzles)	18.9'
Diameter at RCS Nozzles	24.5'
Height (flange to bottom of dome)	34.6'
Weight of RPV Body	450 Tons

US EPR Steam Generator Details	
Steam Drum Outer Diameter (without nozzles)	17.0'
Steam Drum Outer Diameter with nozzles	19.0'
Lower Section Outer Diameter	12.0'
Diameter at RCS Nozzles	24.5'
Overall Height	80.8'
Total Weight	605 Tons

The study examined the ports in Baltimore, MD, Port Elizabeth, NJ, Philadelphia, PA, Port Deposit, MD and Great Lakes ports such as Buffalo, NY, Rochester, NY, and Erie, PA.

In conclusion, the report states, "AREVA construction and transportation personnel performed a high level feasibility study for transporting major NSSS components by rail and/or highway from the ports along the northeast coast of the United States to PPL's proposed site at the Susquehanna Nuclear Station (the new station is now named Bell Bend Nuclear Power Plant) in Salem Township, Luzerne County, PA." The study focused specifically on identifying potential routes that could potentially support the physical size and weight of the shop fabricated reactor pressure vessel and steam generators, and to identify specific areas or issues that will require further evaluation.

"The results of this study found that the RPV for the US EPR is smaller in diameter and nearly half the length and weight of the RPV for Units 1 & 2 (for Susquehanna). The study also found that equipment and technology available for transporting components by rail and roadway is far improved over the technology available in the late 70's and early 80's."

"The results of these surveys indicate that the RPV and SG's can be transported to Susquehanna from one of several locations around Baltimore and Philadelphia via rail, roadway, or a combination of the two with a 90% level of confidence."

However, the report does state that, "Additional detailed route studies need to be performed with the assistance of a transport company, the PA Department of Transportation, and a railroad service provider such as Norfolk Southern or CSX."

The further studies that must be made will be performed during detailed design and procurement of equipment.

With respect to local conditions at the Bell Bend site railroad spur, the potential to alter the means of transport from rail to road can provide an alternative here as well as at any other location along the route if necessary.

The report is available in the Bell Bend Electronic Reading Room.

COLA Impact:

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

H 2.3-1**ESRP 2.3-2**

Summary: *Provide the daily withdrawal and return flow rates from SSES Units 1 and 2 for a two-year period. This period should span times when both units are operating as well as an outage/refueling.*

In addition, provide the application to the SRBC for the Extended Power Uprate for SSES, and the SRBC response.

Full Text: The applicant's experience with water withdrawals at the nearby SSES, and their interaction with the SRBC for additional withdrawals from the Susquehanna River, will inform the staff on how agencies might handle similar requests involving the BBNPP.

Response: Data regarding SSES consumptive use, SSES Susquehanna River water withdrawal data, and total discharge flows from 2007 to 2009 are combined into one Excel file which can be found in Enclosure 3.

SSES Units 1 and 2 operate approximately two years between major refueling outages. In even numbered years Unit 1 has a refueling outage and during odd numbered years, Unit 2 has a refueling outage. These refueling outages typically occur in a March-April time frame. This is reflected in the annual water data presented in Enclosure 3.

The following documents regarding SSES/SRBC extended power uprate interactions support this RAI response and can be found in Enclosure 4.

- 1 Surface Water application
- 2 Request to extend duration of SRBC approval
- 3 SSES Groundwater application required by SRBC in addition to surface water
- 4 Attachments to no. 3, groundwater application: Ground-Water Withdrawal Instructions and Application
- 5 Attachments to no. 3, groundwater application: Ground-Water Withdrawal Application
- 6 SRBC approval for surface water and groundwater withdrawal and consumptive use

PPL (SSES) continues to work with SRBC in developing a water metering plan to meet the requirements of item no. 6 (SRBC approval).

COLA Impact:

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

H 2.3-2ESRP 2.3-2

Summary: Provide additional detail regarding withdrawal quantity and frequency of use from users identified on ER Figures 2.3-66 and 2.3-67.

Full Text: Staff discussed this request and ER Figures 2.3-66 and -67 with the applicant during the site audit.

Response: Figure 2.3-66 illustrates "Surface Water Withdrawal Within Luzerne County" and Figure 2.3-67 shows the location of "Surface Water Withdrawal Within 5-mile Radius."

In Pennsylvania, the consumptive surface water use is managed by the Pennsylvania Department of Environmental Protection (PADEP) and regulated by the Susquehanna River Basin Commission (SRBC).

According to the PADEP, the Water Resources Planning Act (Act 220) requires the PADEP to conduct a statewide water withdrawal and use registration and reporting program (PADEP, 2008). Each public water supply agency, each hydropower facility (irrespective of the amount of withdrawal), and each person who withdraws or uses more than 10,000 gallons of water per day (gpd) (37,854 lpd) over any 30-day period, must register their withdrawal or withdrawal use.

The use of water from the Susquehanna River is regulated by the SRBC, an agency created by a compact between the federal government and the states hosting the Susquehanna River. Operations subject to the SRBC are those that exceed the consumption rate of 20,000 gpd (75,708 lpd) over a 30-day average (SRBC, 2007). Consumption rates less than the 20,000 gpd fall under Pennsylvania Act 220.

PADEP maintains the PA Commonwealth Water Use Data System (WUDS) which contains information on water withdrawals for all use sectors. PADEP has reprocessed data extract, and has included the Environment, Facility Application, Compliance Tracking System (eFACTS) Client ID and Site ID for surface water withdrawals for Luzerne County. Withdrawal volumes are displayed in gallons. PADEP also mentioned that this is an inclusive list of the surface water withdrawal reports received for Luzerne County for 2005-2008.

PADEP data on water withdrawals can be found in Enclosure 5 (in both MS Excel format and pdf). These withdrawal data provided by PADEP include groundwater and surface water users within Luzerne County.

PADEP is building a website, which will provide a download tool for the public to access water withdrawal information directly. This will facilitate the US Nuclear Regulatory Commission in obtaining more detailed information regarding water withdrawals near the BBNPP Site.

References cited in the response:

PADEP, 2008, "Water Withdrawal and Use Registration," Pennsylvania Department of Environmental Protection, Website:
<http://www.depweb.state.pa.us/watershedmgmt/cwp/view.asp?a=1426&q=513271&watershedmgmtNavPage=> Accessed: February 6, 2008.

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](http://www.srbc.net/pubinfo/docs/Agricultural%20Water%20Use%20(1_07).PDF) Accessed:
May 5, 2008.

COLA Impact:

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

H 3.6-1**ESRP 3.6.1**

Summary: *Provide supplemental information on the intake source water quality data presented in ER Table 3.6-3. Include information on seasonal values of chemical analytes in intake and receiving waters.*

Full Text: ESRP 3.6.1 identifies the need for average, maximum, and seasonal variations of principal constituents of intake and receiving waters and any minor or trace materials that may be of environmental relevance. The ER reports only yearly-average values.

Response: Attached is Table 1, Susquehanna River Water Quality at Intake, that presents the results of (approximate) quarterly river sampling that was conducted in 2006 and 2007. Also attached are associated charts of selected, representative river sampling data (from near the intake) that show the results of quarterly monitoring data over time for this two year period. For some "total" metals and suspended solids, the results for this two-year monitoring period are skewed by the results for one sampling event (total aluminum, 3/15/2007) in the first quarter of 2007.

Table 2, Susquehanna River Water Quality at Discharge, and associated charts show the river water quality in the vicinity of the planned discharge location (the receiving water). This table and charts presents the river sampling data for the same quarterly sampling events as the "intake" water discussed above. The sampling location is downstream of the SSES discharge.

All referenced tables and charts are included below.

COLA Impact:

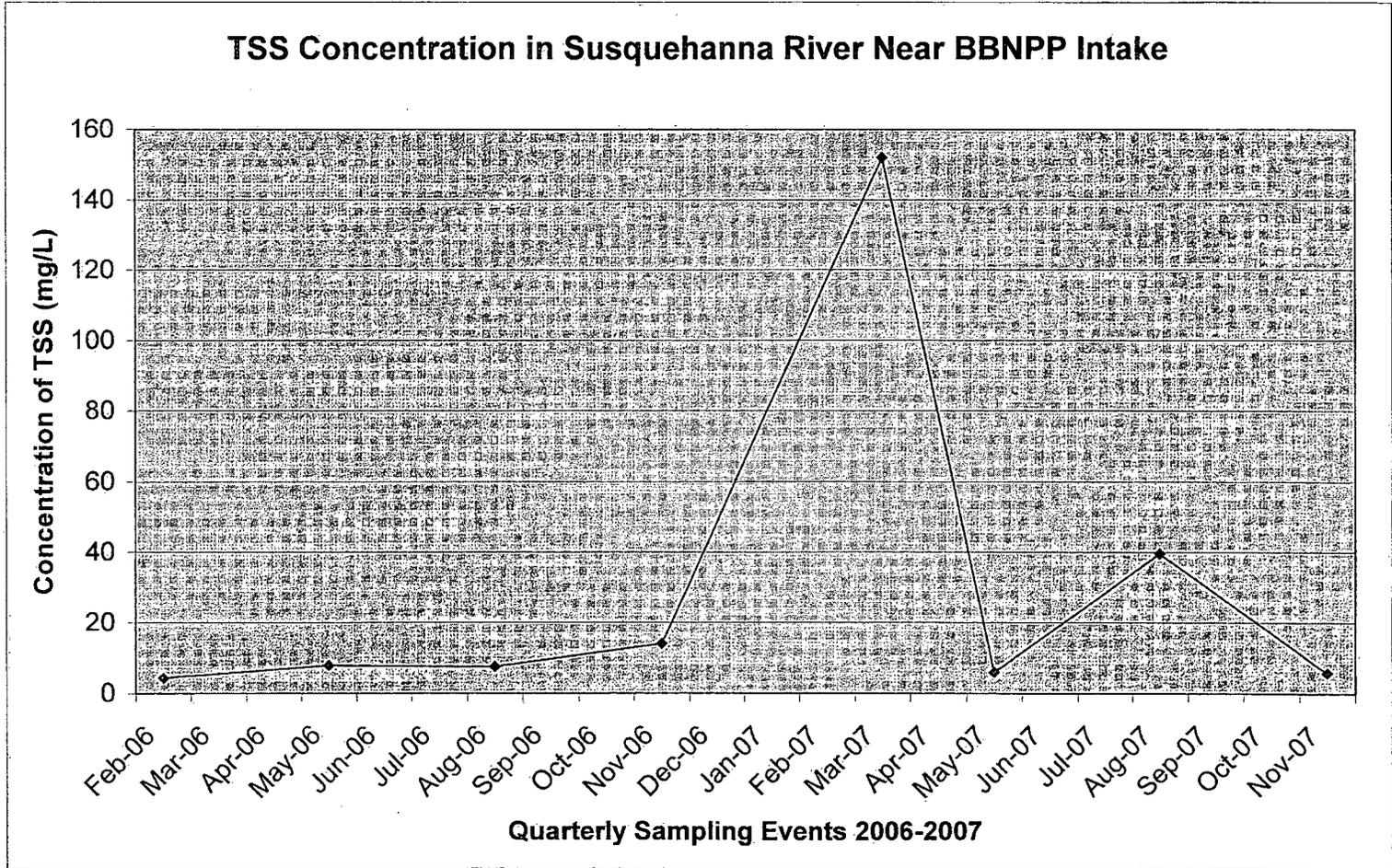
No changes to the BBNPP COLA ER are required as a result of this RAI response.

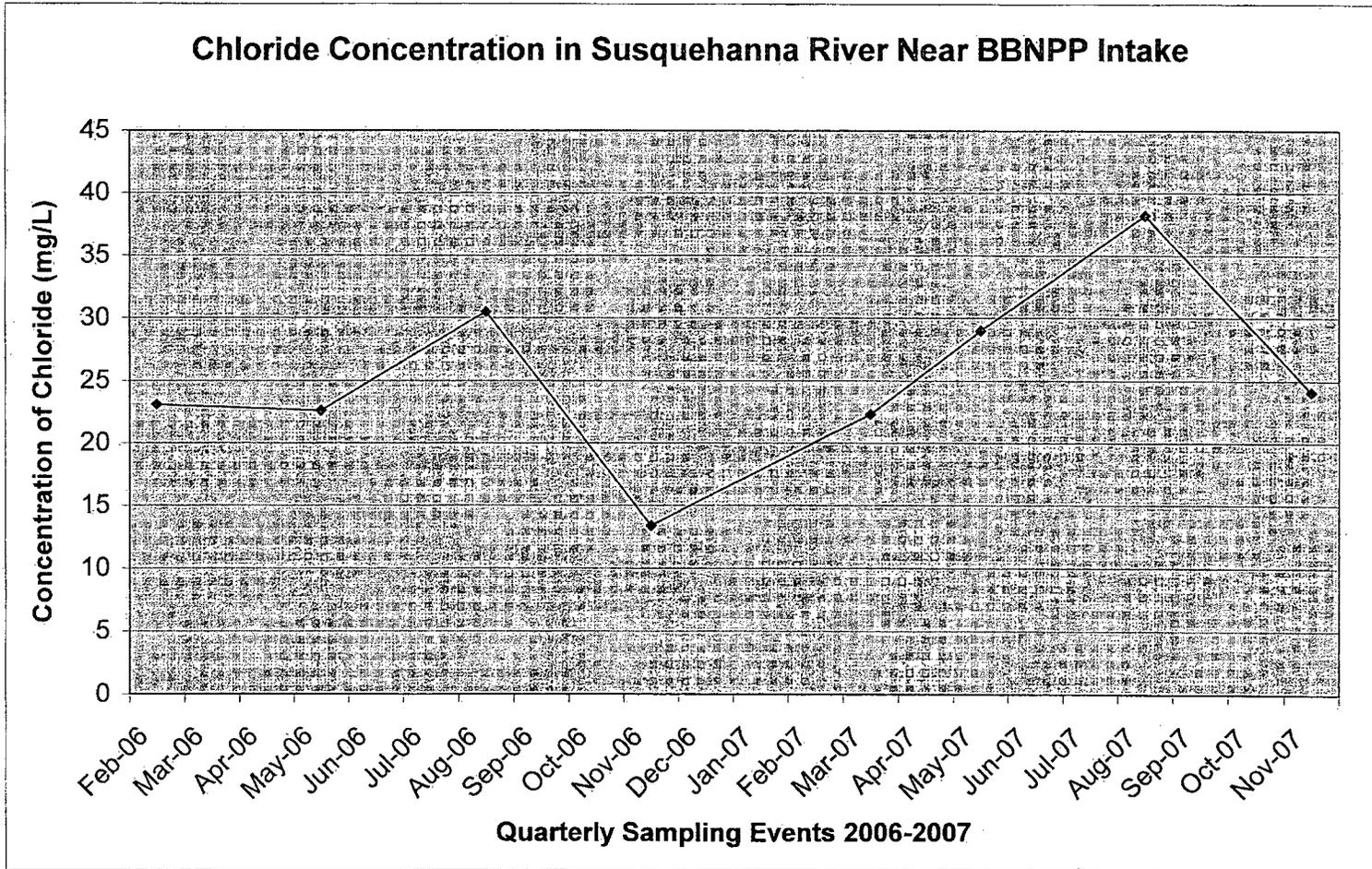
Table 1

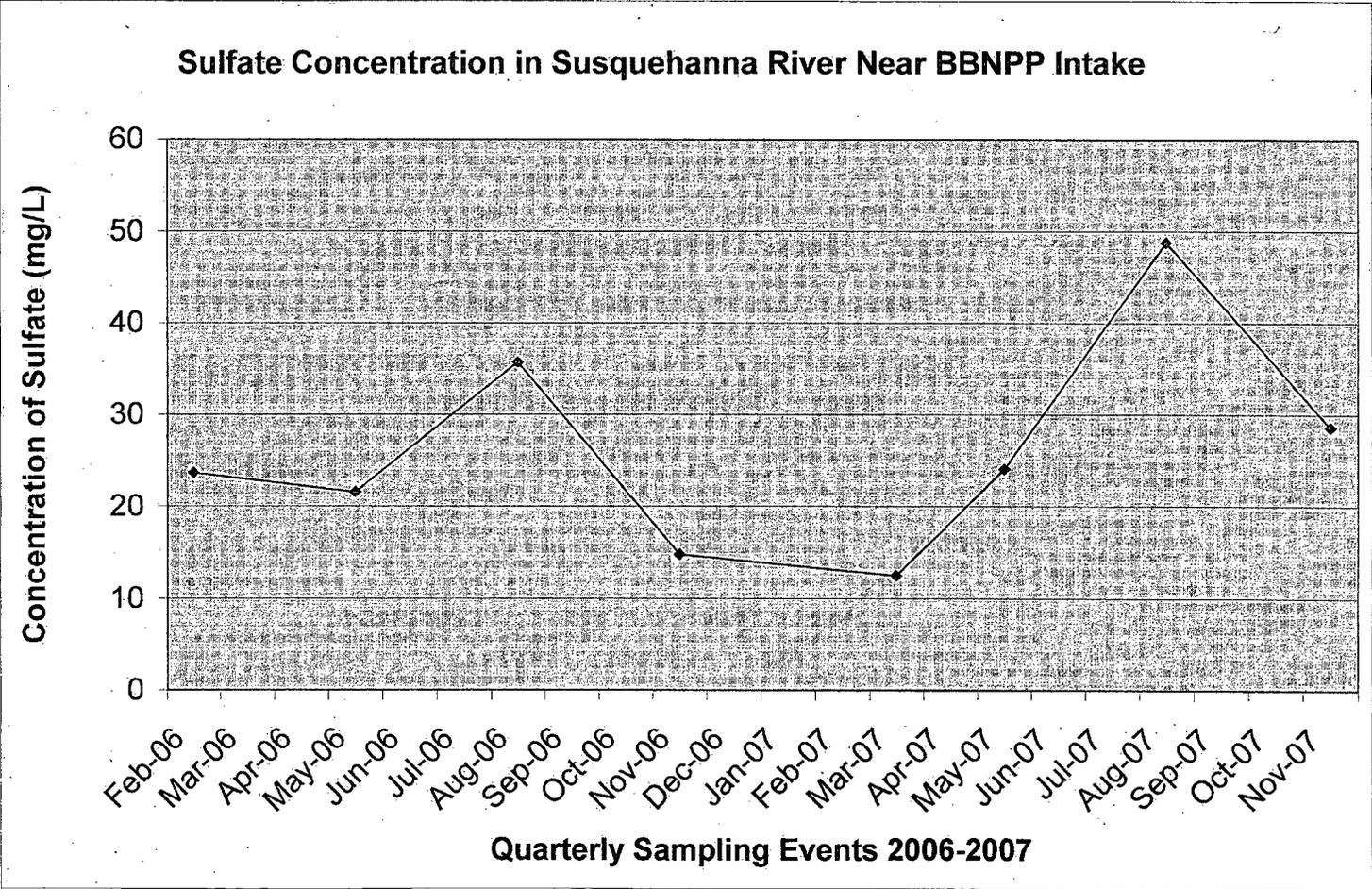
Susquehanna River Water Quality at Intake

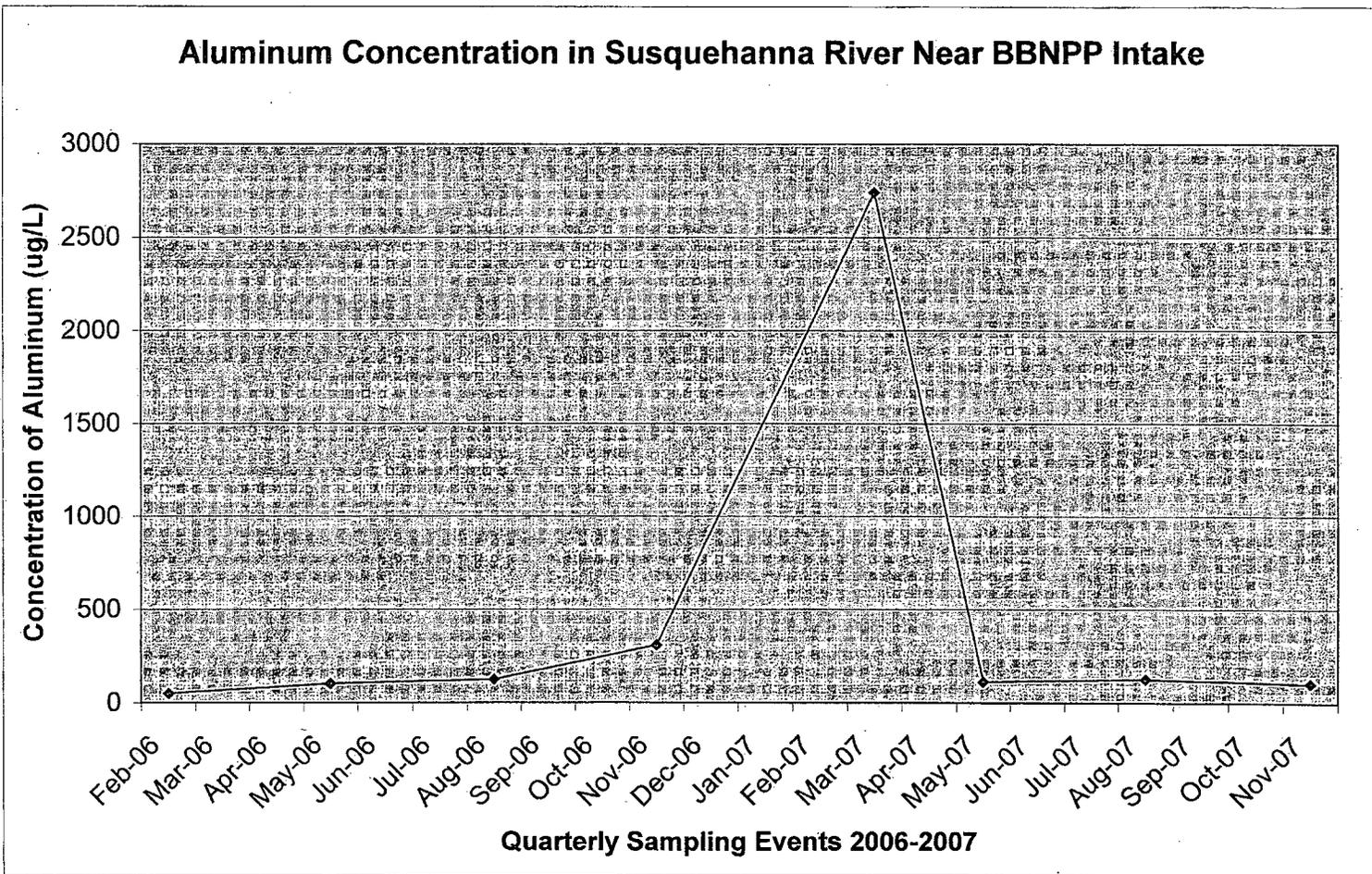
Location		SSES	SSES	SSES	SSES	SSES	SSES	SSES	SSES	MIN	MAX	AVE	% Difference
Sample Date		2/23/2006	5/18/2006	8/16/2006	11/16/2006	3/15/2007	5/21/2007	8/23/2007	11/7/2007				
Parameter	Units												
pH Lab		7.61	8.04	7.9	7.72	8.75	8.91	8.8	7.78				
Total Alkalinity	mg/L	56	62	94	44	39	65	58	60	39	94	59.8	83
Total Suspended Solids	mg/L	4.3	8	7.6	14	152	6	39.6	5.8	4.3	152	29.7	189
Silicon Dioxide	mg/L	3.9	0.2	3.77	4.69	3.31	0.22	1.96	4.46	0.2	4.69	2.8	184
Bicarbonate as CaCO3	mg/L	68.3	75.6	94	44	39	65	58	60	39	94	63.0	83
Chloride	mg/L	23.1	22.6	30.5	13.4	22.3	29	38.2	24.1	13.4	38.2	25.4	96
Fluoride	mg/L	0.05	0.06	0.09	0.06	<0.05	0.07	0.1	0.05	0.05	0.1	0.1	67
Nitrate as NO3	mg/L	3.4	1.2	1.8	2	3	1.3	1.9	2.5	1.2	3.4	2.1	96
Nitrate as N	mg/L	0.8	0.3	0.4	0.4	0.7	0.3	0.4	0.6	0.3	0.8	0.5	91
Phosphorus as PO4	mg/L	0.092	0.135	0.104	0.353	0.736	0.117	0	0.132	0	0.736	0.2	200
Sulfate	mg/L	23.7	21.6	35.7	14.8	12.5	24.1	48.8	28.6	12.5	48.8	26.2	118
Aluminum, Total	ug/L	50	104	124	308	2740	112	127	103	50	2740	458.5	193
Barium, Total	ug/L	25	30	34	25	58	28	32	30	25	58	32.8	80
Calcium, Dissolved	mg/L	25.9	24.4	38.5	19.1	17.3	28.4	29.6	27.6	17.3	38.5	26.4	76
Calcium, Total	mg/L	25.6	24.3	38.5	19	17.9	28.3	29	27.5	17.9	38.5	26.3	73
Iron, Dissolved	mg/L	0.17	0.07	0.07	0.11	0.04	0.03	0.06	0.28	0.03	0.28	0.1	161
Iron, Total	mg/L	0.56	0.51	0.61	0.81	5.86	0.58	0.71	0.83	0.51	5.86	1.3	168
Magnesium, Dissolved	mg/L	5.56	5.15	8.52	3.82	3.45	6.22	10	6.08	3.45	10	6.1	97
Magnesium, Total	mg/L	5.52	5.19	8.56	3.89	4.29	6.24	9.99	6.06	3.89	9.99	6.2	88
Manganese, Dissolved	ug/L	88	26	48	37	42	53	145	102	26	145	67.6	139
Manganese, Total	ug/L	5.52	5.19	120	53	257	100	223	129	5.19	257	111.6	192
Potassium, Dissolved	mg/L	1.13	1.28	1.69	1.5	1.46	1.58	2.24	1.76	1.13	2.24	1.6	66
Potassium, Total	mg/L	1.1	1.31	1.73	1.54	1.86	1.6	2.24	1.76	1.1	2.24	1.6	68
Sodium, Dissolved	mg/L	13.3	13	18.8	8.6	12.6	17.2	23	14.8	8.6	23	15.2	91
Sodium, Total	mg/L	13.3	12.9	1.73	1.54	12.3	16.9	22.7	14.6	1.54	22.7	12.0	175
Strontium, Total	ug/L	88	79	152	56	54	103	167	110	54	167	101.1	102
Zinc, Total	ug/L	N.D.	N.D.	N.D.	10	26	10	N.D.	N.D.	10	26	5.8	89
Arsenic, Total	ug/L	0.5	0.5	0.5	0.5	2.9	<1.0	1.2	<1.0	0.5	2.9	0.8	141
Lead, Total	ug/L	N.D.	N.D.	N.D.	N.D.	5	N.D.	N.D.	N.D.	5	5	0.6	0
TMS Corrected	mg/L	133.55	126.68	195.74	94.28	147.03	147.03	190.5	145.81	94.28	195.74	147.6	70
Calcium Hardness	mg/L	64.7	60.9	96.1	47.7	70.9	70.9	73.9	68.9	47.7	96.1	69.3	67
Total Hardness	mg/L	86.7	82	131	63.5	96.4	96.4	114	93.6	63.5	131	95.5	106

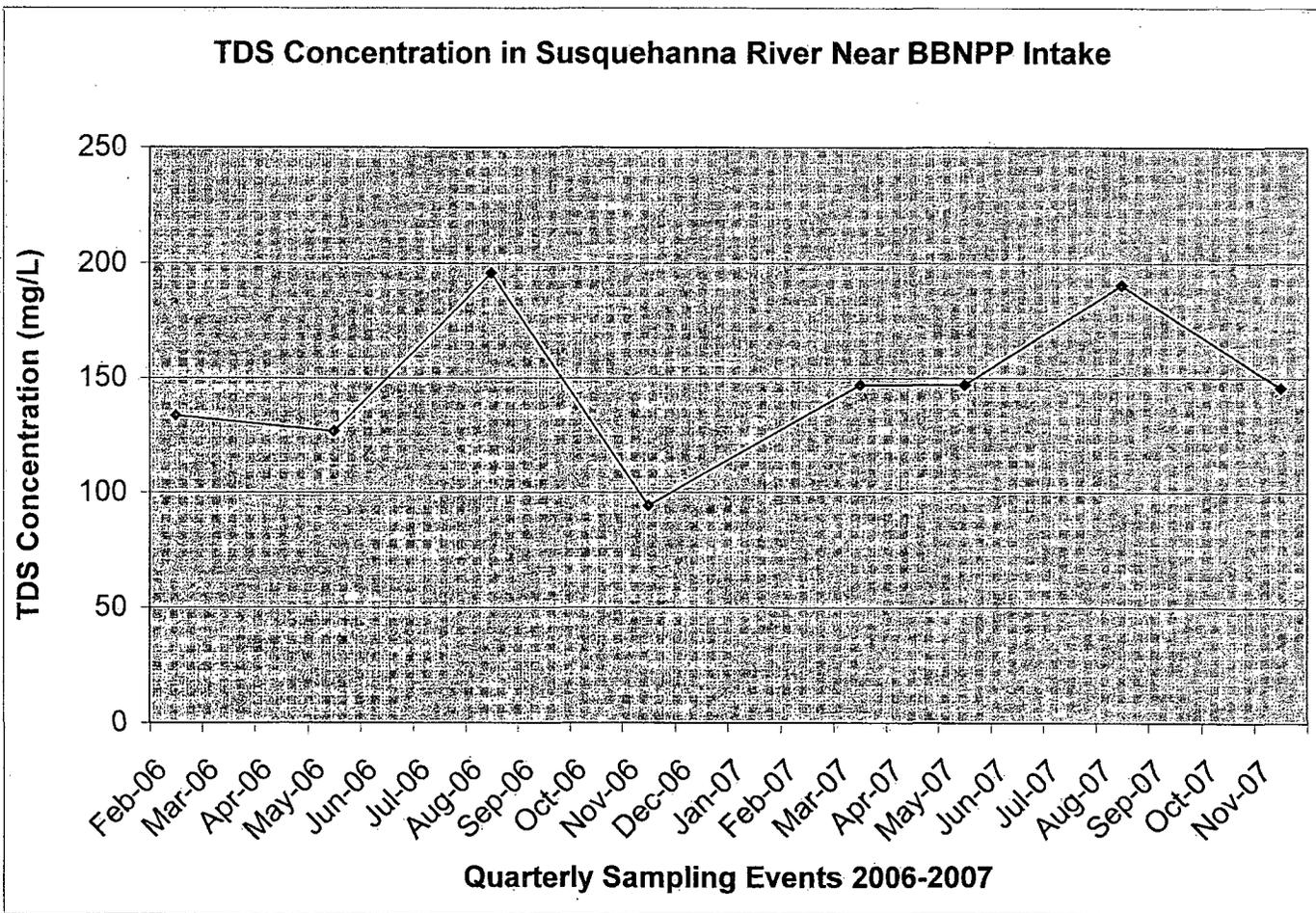
Based on quarterly river sampling for 2006 and 2007. Laboratory analysis performed by PPL Laboratory, Hazleton, PA. Ref. BBNPP Water Balance 38-9080906-001.











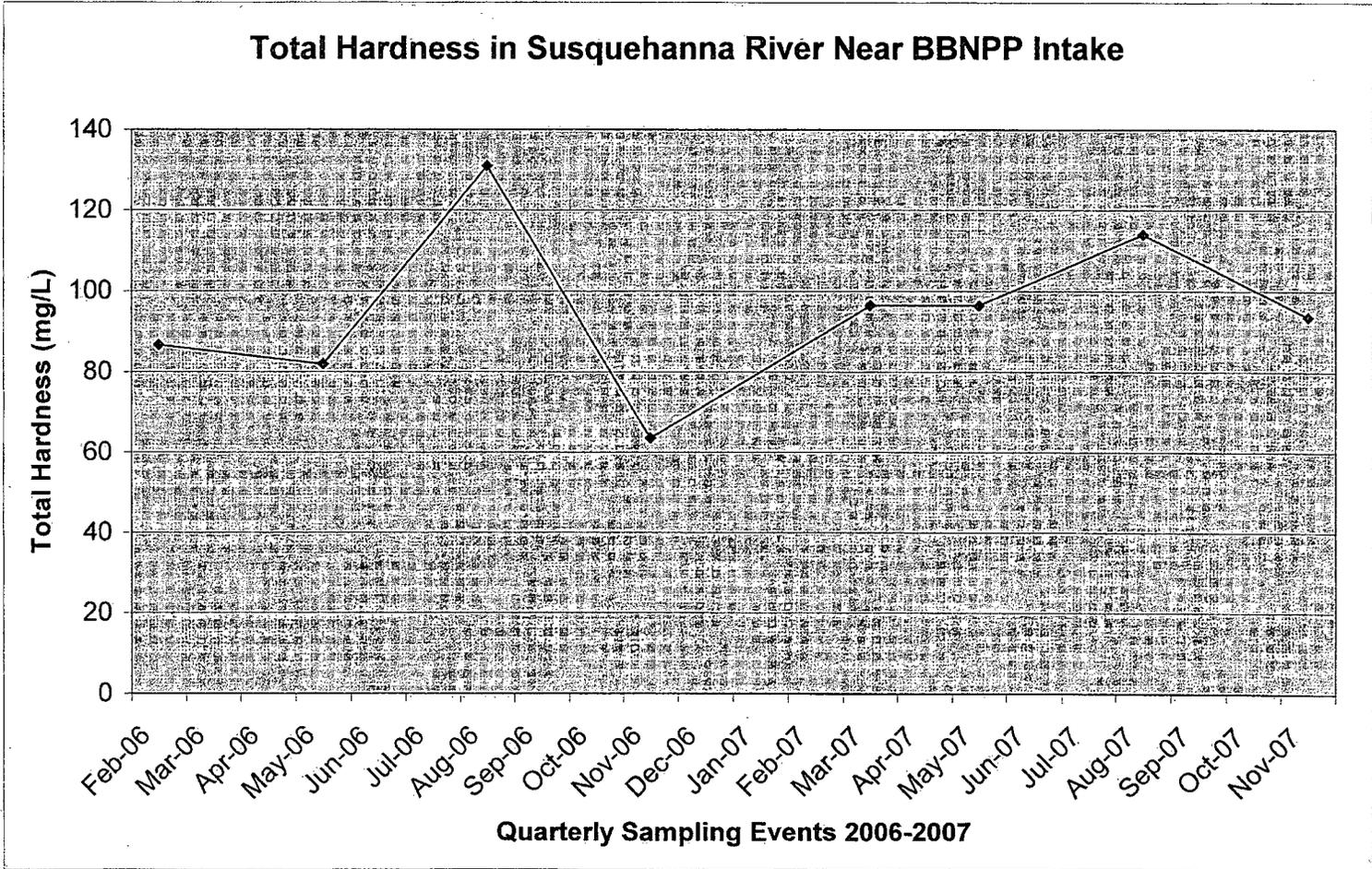
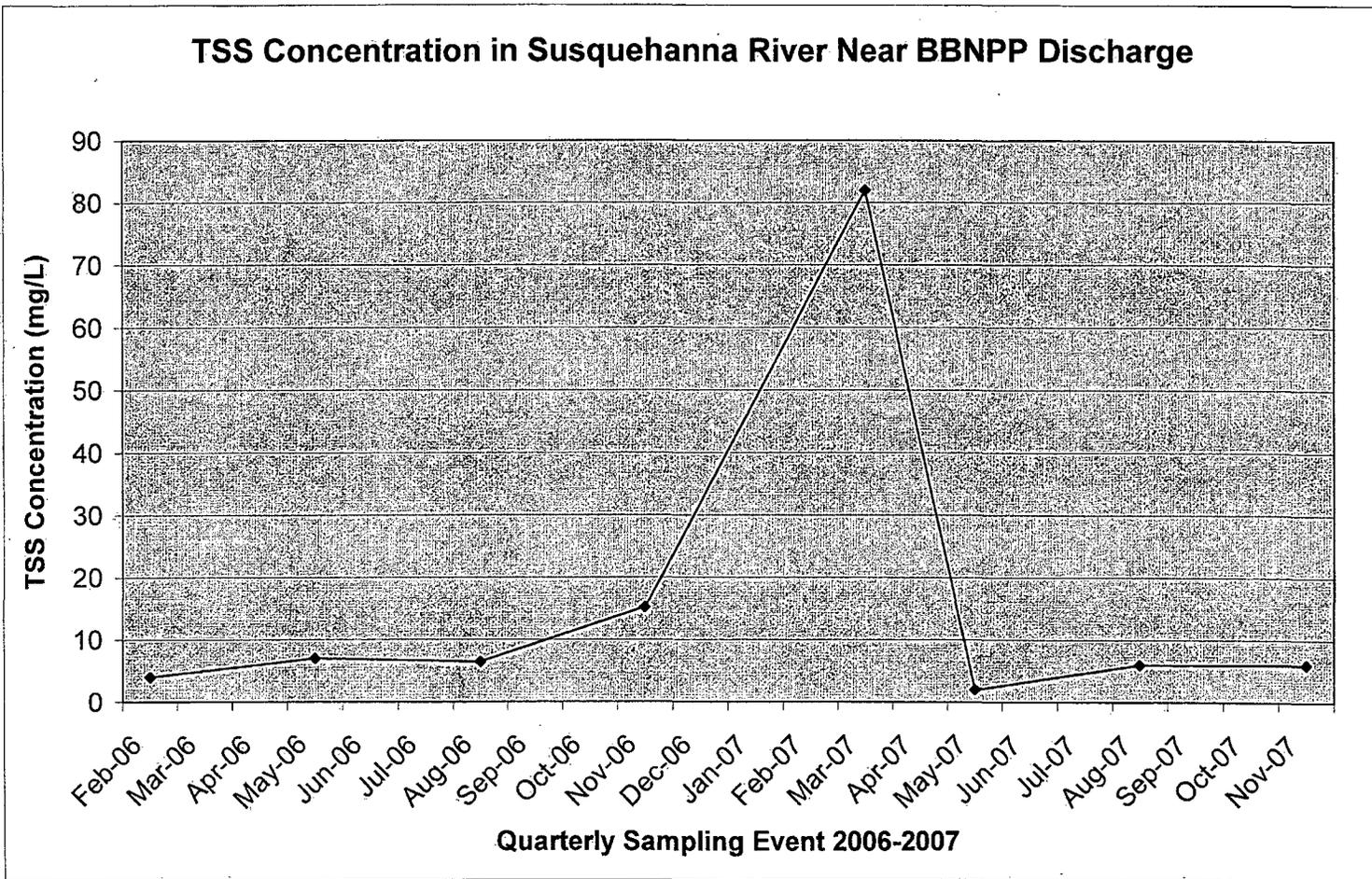
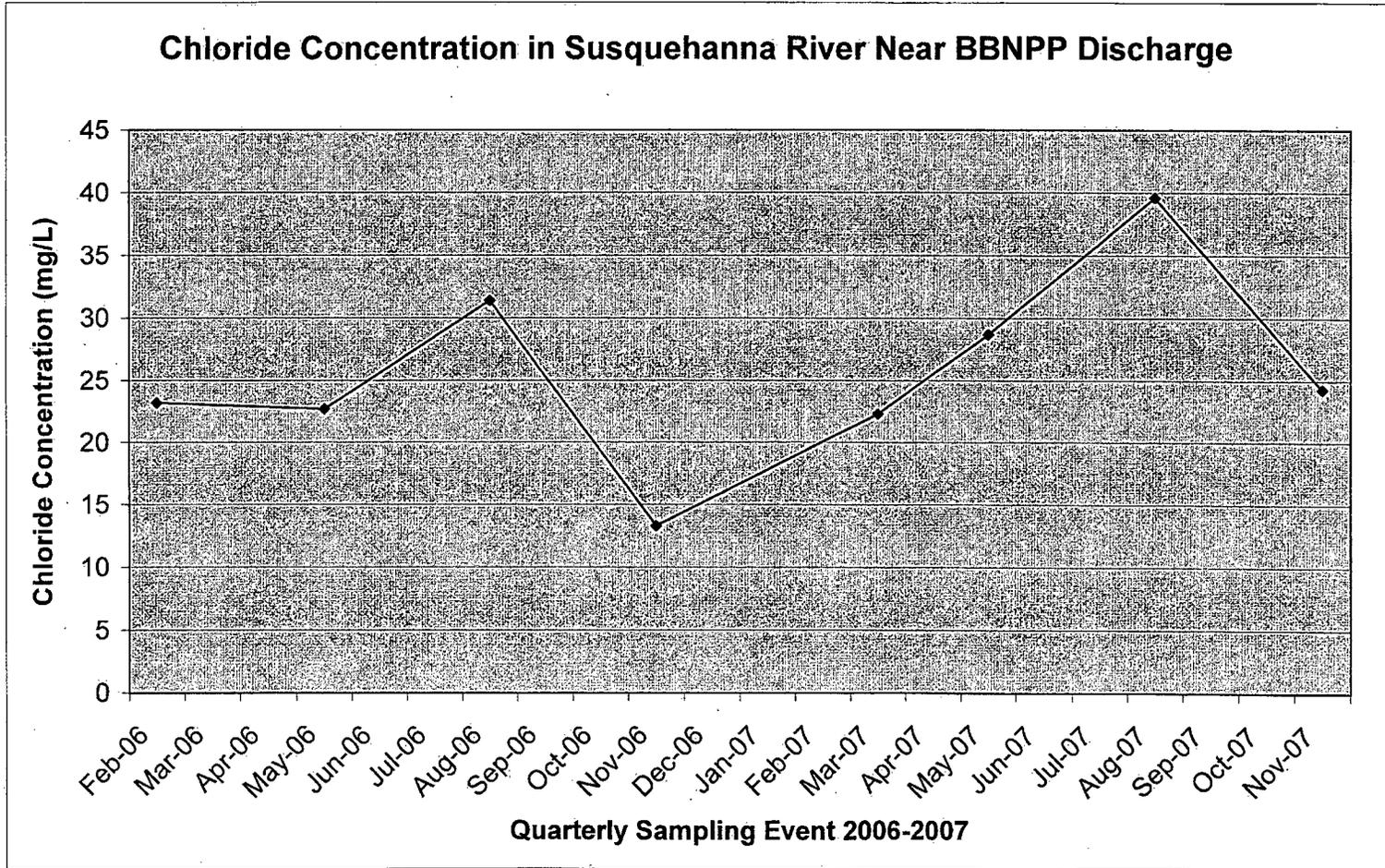


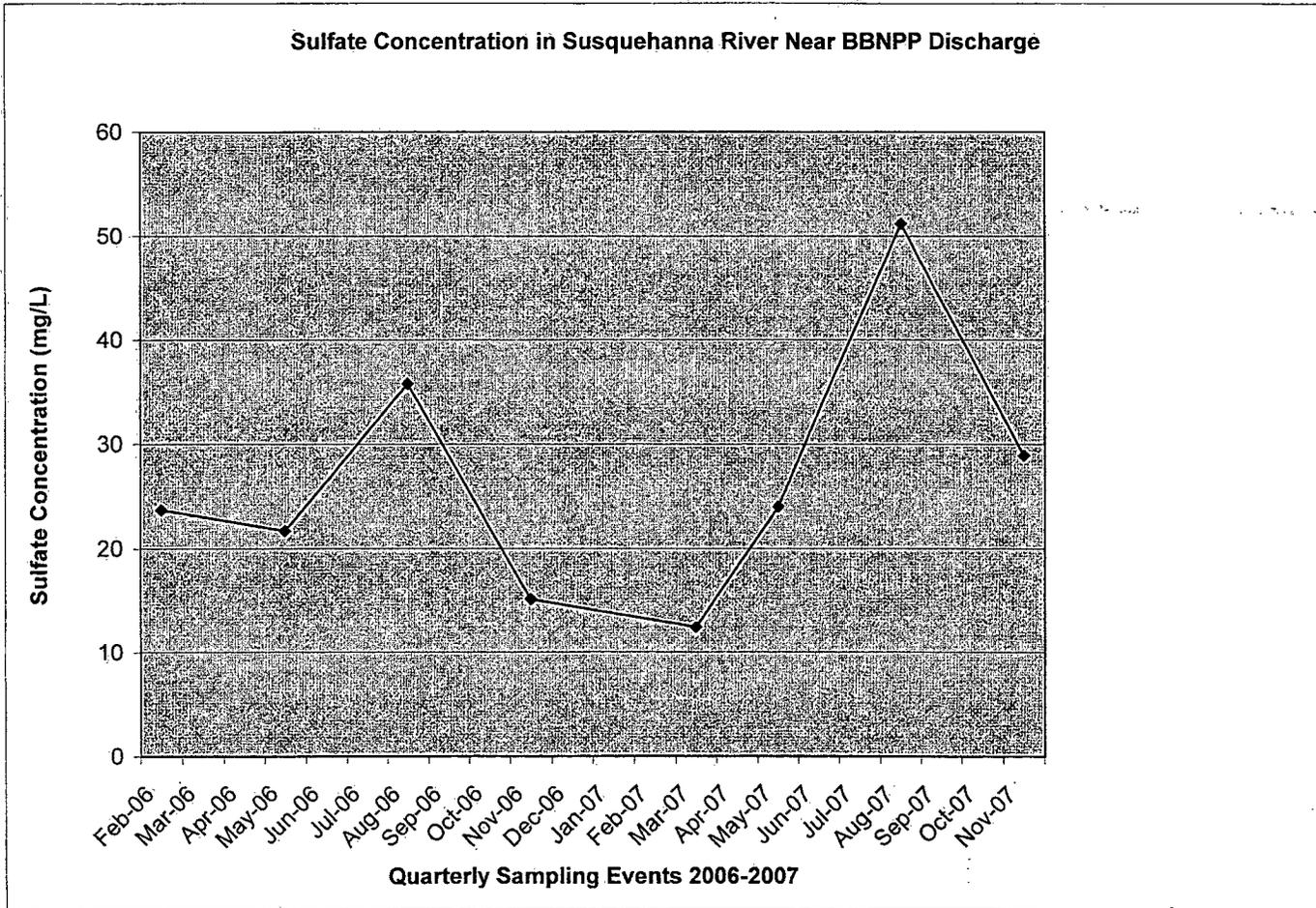
Table 2

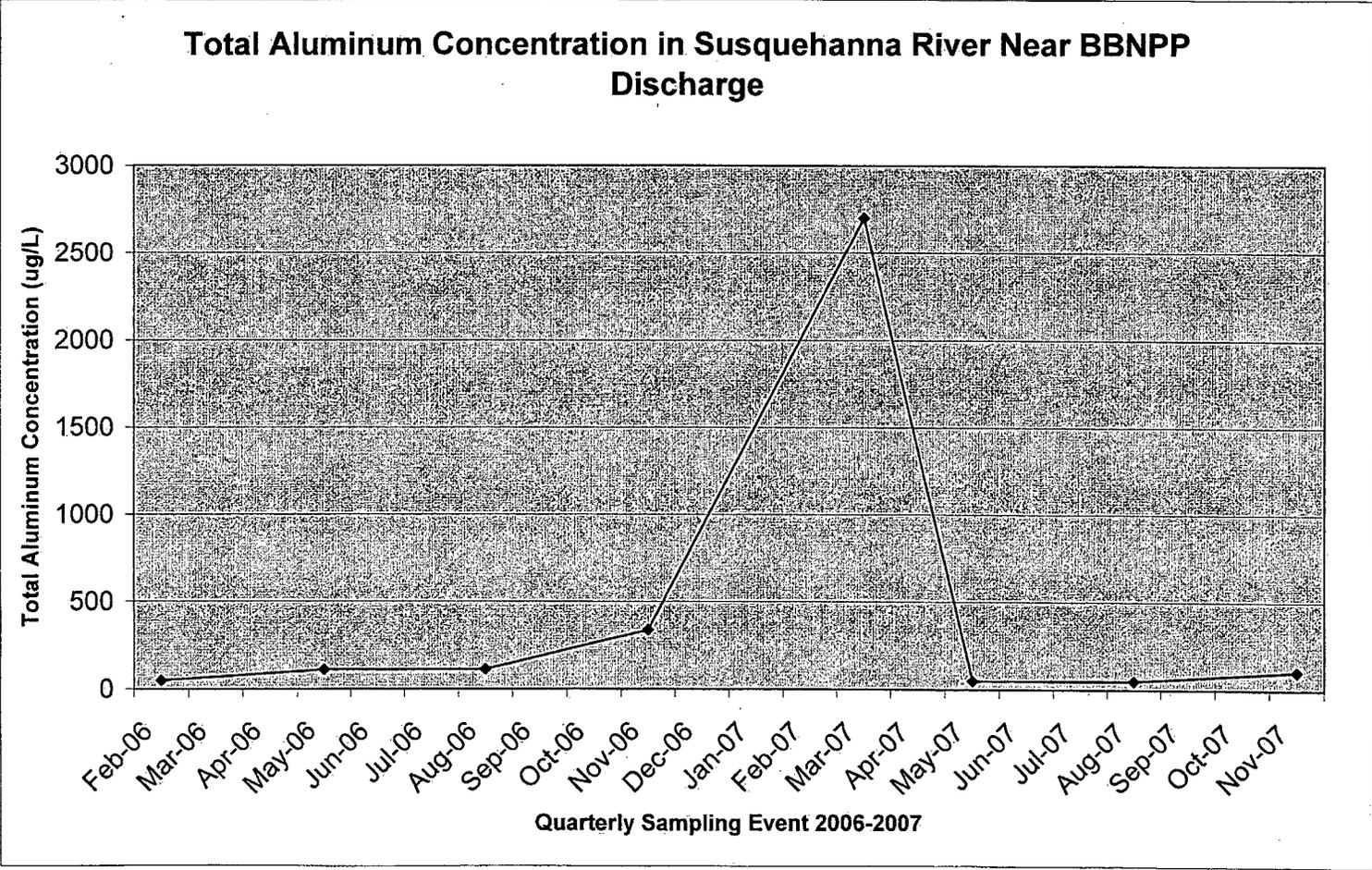
Susquahanna River Water Quality at Discharge

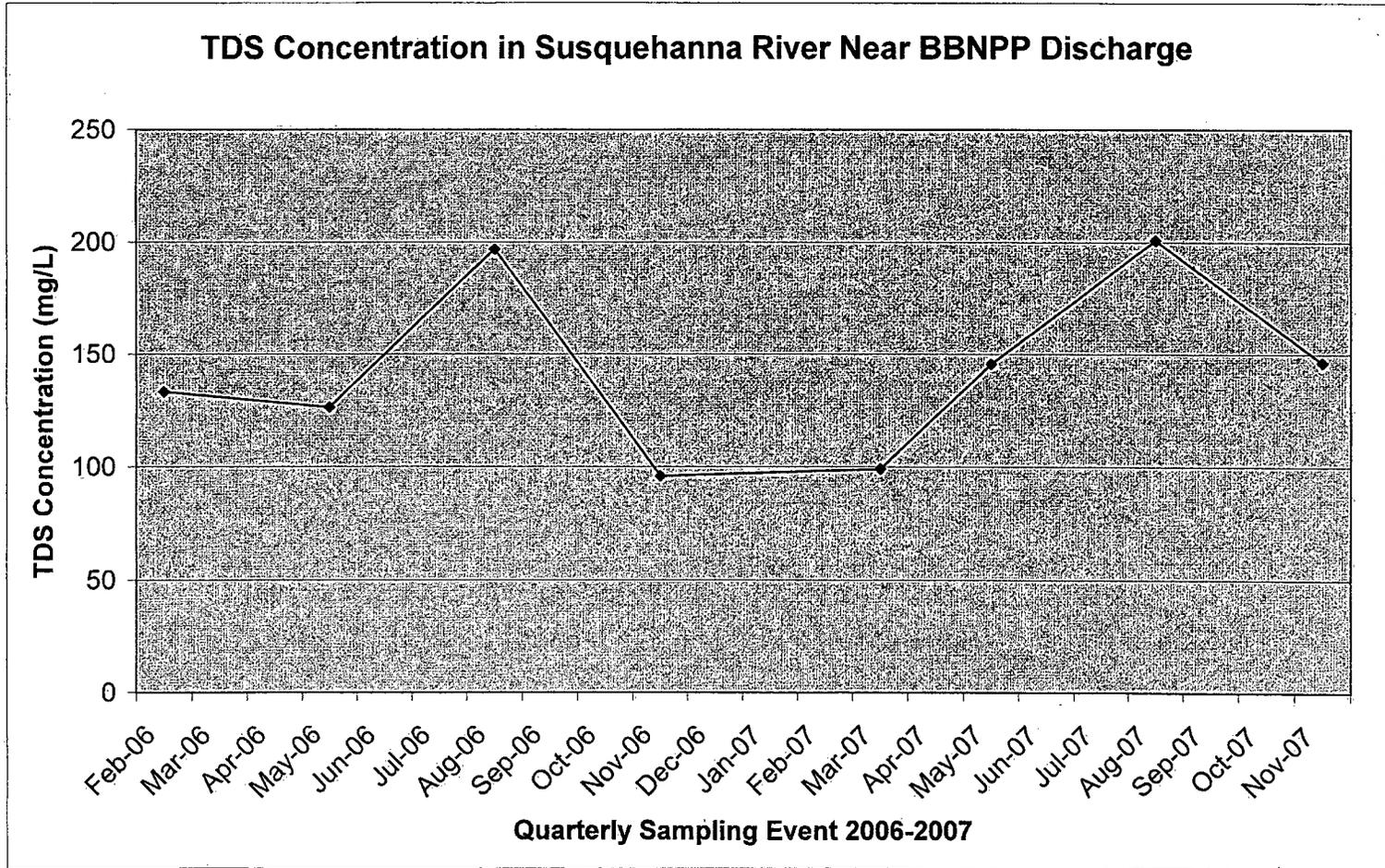
Location Sample Date	Bell Bend 2/23/2006	Bell Bend 5/18/2006	Bell Bend 8/16/2006	Bell Bend 11/16/2007	Bell Bend 3/15/2007	Bell Bend 5/21/2007	Bell Bend 8/23/2007	Bell Bend 11/7/2007	MIN	MAX	AVE	% Difference
Parameter												
Total Alkalinity mg/L	56	61	94	46	38	65	64	60	38	94	60.5	84.8
Total Suspended Solids mg/L	4	7	6.4	15.2	82	2	6	6	2	82	16.1	190.5
Silica (Silicon Dioxide) mg/L	3.9	0.2	3.69	4.75	3.25	0.18	2.06	4.45	0.18	4.75	2.8	185.4
Bicarbonate as CaCO3 mg/L	68.3	74.4	94	46	38	65	64	60	38	94	63.7	84.8
Chloride mg/L	23.2	22.7	31.4	13.3	22.3	28.7	39.6	24.3	13.3	39.6	25.7	99.4
Fluoride mg/L	0.06	0.06	0.11	0.07	ND	0.07	0.1	0.06	0.06	0.11	0.1	58.8
Nitrate as NO3 mg/L	3.4	1.3	1.8	2	3	1.2	2	2.4	1.2	3.4	2.1	95.7
Nitrate as N mg/L	0.8	0.3	0.4	0.4	0.7	0.3	0.4	0.5	0.3	0.8	0.5	90.9
Phosphorus as PO4 mg/L	0.092	0.147	0.101	0.31	0.712	0.12	0.092	0.172	0.092	0.712	0.2	154.2
Sulfate mg/L	23.7	21.7	35.8	15.1	12.4	24	51.2	28.9	12.4	51.2	26.6	122.0
Aluminum, Total ug/L	50	110	113	338	2700	50	50	104	50	2700	439.4	192.7
Barium, Total ug/L	25	30	34	24	55	28	34	31	24	55	32.6	78.5
Calcium, Dissolved mg/L	25.6	24.3	38.7	19.2	17.7	28.1	30.6	27.8	17.7	38.7	26.5	74.5
Calcium, Total mg/L	25.5	24.3	38.8	18.9	18.3	28.4	30.7	28.1	18.3	38.8	26.6	71.8
Iron, Dissolved mg/L	0.18	0.06	0.07	0.11	0.04	0.03	0.07	0.28	0.03	0.28	0.1	161.3
Iron, Total mg/L	0.55	0.5	0.59	0.86	5.58	0.51	0.73	0.89	0.5	5.58	1.3	167.1
Magnesium, Dissolved mg/L	5.49	5.15	8.53	3.86	3.42	6.13	10.5	6.09	3.42	10.5	6.1	101.7
Magnesium, Total mg/L	5.49	5.18	8.6	3.84	4.31	6.26	10.6	6.18	3.84	10.6	6.3	93.6
Manganese, Dissolved ug/L	92	23	44	34	44	51	147	99	23	147	66.8	145.9
Manganese, Total ug/L	94	112	118	55	231	97	223	137	55	231	133.4	123.1
Potassium, Dissolved mg/L	1.07	1.26	1.68	1.42	1.45	1.41	2.32	1.71	1.07	2.32	1.5	73.7
Potassium, Total mg/L	1.08	1.29	1.72	1.38	1.83	1.47	2.34	1.79	1.08	2.34	1.6	73.7
Sodium, Dissolved mg/L	13.3	13.1	18.7	8.64	12.7	16.8	24.2	14.6	8.64	24.2	15.3	94.8
Sodium, Total mg/L	13.2	12.9	18.7	8.45	12.4	16.9	24.1	14.7	8.45	24.1	15.2	96.2
Strontium, Total ug/L	88	79	152	55	54	103	177	112	54	177	102.5	106.5
Zinc, Total ug/L	ND	ND	10	10	24	ND	ND	ND	10	24	5.5	82.4
Arsenic, Total ug/L	0.5	ND	0.5	0.5	2.8	0.5	1.1	0.5	0.5	2.8	0.8	139.4
Lead, Total ug/L	ND	ND	ND	ND	5	ND	ND	ND	5	5	0.6	0.0
TDS mg/L	133.17	126.29	196.79	95.78	98.98	145.58	200.88	146.26	95.78	200.88	143.0	70.9
Calcium Hardness mg/L	63.9	60.7	96.6	47.9	44.2	70.2	76.4	69.4	44.2	96.6	66.2	74.4
Total Hardness mg/L	86.3	82	132	63	63.4	96.7	120	95.6	63	132	92.4	70.8

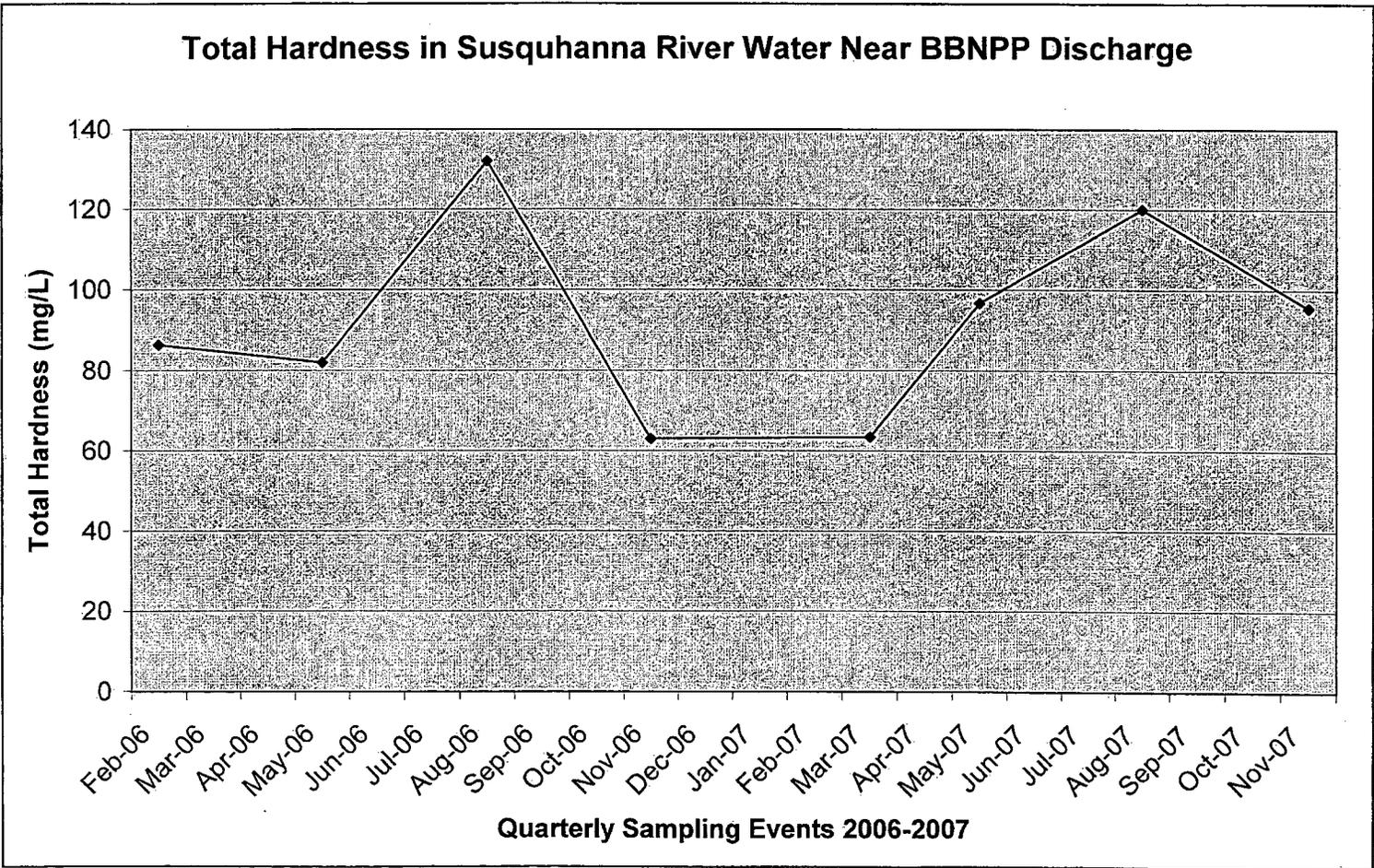












SE 2.5-10ESRP 2.5.4

Summary: *Extend the consideration of Environmental Justice out to a 50-mile radius.*

Full Text: None

Response: NUREG-1555, Section 2.5.4 Environmental Justice, requires that environmental justice (i.e., subsistence or other minority or low-income impacts) be addressed within the environmental impact area.

For the BBNPP proposed facility, impacts were evaluated within the two county ROI because this area was identified as being where potential environmental impacts were most likely to occur, and also where potential disproportionate impacts would most likely occur.

Additional resources were consulted to determine the availability of information regarding the low income and minority populations within the two-county region of influence (ROI) and out to a 50-mile radius. Information on subsistence activities, while limited, is presented in the responses to BBNPP ER RAI SE 2.5-12 (PPL, 2009); SE 2.5-13 and SE 4.4-14 (this submittal).

Reference cited in response: (PPL, 2009) BNP-2009-217, Bell Bend Nuclear Power Plant Response to Environmental Requests for Additional Information, Second Submittal, from R. R. Sgarro (PPL), to Document Control Desk (NRC), dated August 10, 2009.

COLA Impact:

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

SE 2.5-13**ESRP 2.5.4**

Summary: *Provide detailed data for subsistence practices, particularly agricultural uses, of distinct minority, low income, and distinctive populations to the extent feasible.*

Full Text: Use contacts with local social service agencies, NGOs, and a review of technical literature to document local subsistence activities, to the extent feasible.

Response:**Agricultural Subsistence**

Subsistence farming primarily refers to self-sufficient farming in which producers grow only enough food to feed their family rather than farming for commercial ventures. For purposes of this evaluation, it was assumed that the distribution of farms among minority groups and according to farm size and income may provide some insights as to the relative importance of subsistence farming.

According to the Pennsylvania Farm Link, minority farm operators accounted for only 2.5% of the total farm "operators" in Pennsylvania in 1997 (PA Farm Link, 2009). Fewer than 600 Pennsylvania state farmers, or one percent, are members of minority groups (CRPA, 2004). The term operator designates a person who operates a farm, either doing the work or making day-to-day decisions about such things as planting, harvesting, feeding, and marketing. The operator may be the owner, a member of the owner's household, a hired manager, a tenant, a renter, or a sharecropper. If a person rents land to others or has land worked on by others, he/she is considered the operator only of the land which is retained for his/her own operation (USDA, 2002b).

Statewide, in 2002, there were 58,105 farms and 87,351 total operators. The distribution among minority group operators is shown below:

- 84,577 were white (96.8%);
- 104 were black or African American (0.12%);
- 125 were American Indian or Alaska Natives (0.14%);
- 10 were Native Hawaiian or Other Pacific Islander (0.01%);
- 55 were Asian (0.06%); and
- 186 were more than one race (0.21%) (USDA, 2002b).

Within the Commonwealth of Pennsylvania, the average farm size was 133 acres, while the median was 90 acres. Luzerne County had a total of 548 farms that averaged 134 acres while Columbia County had a total of 884 farms that averaged 140 acres in size.

In the 2007 Agricultural Census, 5,601 Pennsylvania farms were comprised of one to nine acres of land each. Columbia County had 35 farms with one to nine acres and Luzerne County had

53 farms of that size. Among state farms, a total of 27,495 farms had income less than \$2,500 in the 2007 census. Columbia County had 51 and Luzerne County 320.

Additional information about minority farmers was found in the Agricultural Census for Luzerne and Columbia Counties. To remain consistent with existing data presented in ER Rev. 1, the 2002 Agricultural Census data was used for the following information.

In 2002, Luzerne County had a total of 548 farms with 809 operators. Of the total number of operators, 776 were white; two were black or African American; two were American Indian or Alaska Natives; two were of Hispanic descent; and three were more than one race. No operators were of Asian, Native Hawaiian, or Pacific Islander descent (USDA, 2002b).

Within Luzerne County, the average farm size was 134 acres, while the median was 80 acres. In the 2002 Agricultural Census, 59 farms were comprised of one to nine acres each (USDA, 2002b).

In 2002, there were 884 farms with 1,221 operators within Columbia County. Of the total operators, 1,201 were white; two were American Indian or Alaska Natives; two were of Hispanic descent; and two were more than one race. No operators were of black, African American, Asian, Native Hawaiian, or Pacific Islander descent (USDA, 2002b).

Within Columbia County, the average farm size was 140 acres, while the median was 86 acres. In the 2002 Agricultural Census, 49 farms were comprised of one to nine acres.

Another internet search provided information about the lack of nutrition among minority and low-income populations. This resource first was evaluated on April 9, 2009. With regard to subsistence, the lack of nutritional foods inadvertently can affect uniquely vulnerable minority and low-income communities. In 2004, the Pennsylvania Department of Health and Human Services was awarded a grant to initiate a program to, in part, address common risk factors associated with obesity, including nutrition. This program assists large and small cities, tribes, and rural and urban communities to implement local action plans to reduce health disparities and to promote quality health care and prevention services (STHPLC, 2009).

Hunting, Gathering, and Fishing Activities

National statistics for hunting suggest that participation rates of Hispanics and African-Americans are much lower than for the rest of the population. Approximately six percent of the total population hunt, while only 2 percent of Hispanics hunt, and 1 percent of African-Americans (USFWS, 2004).

National statistics also suggest that Hispanic hunters tend to hunt big game. Seventy-five percent of Hispanic hunters hunt big game in comparison to 29 percent hunting small game, 35 percent hunting migratory birds, and 9 percent hunting other animals. For example, 67 percent of Hispanic hunters hunt deer and only 10 percent hunt rabbit (USFWS, 2004).

African-Americans tend to hunt small game (69 percent), which is more than the general population (42 percent). They have a high percentage of hunting for small game such as rabbit and squirrel (USFWS, 2004).

National statistics also suggest that for fishing activities, Hispanics and African-Americans each had a participation rate of seven percent (USFWS, 2004).

State statistics for 2006 yield little information about minority and low-income sportspersons, anglers, and hunters. Specific data about Hispanic, Black, and Other Racial groups was not reported due to a small sample size. Likewise, information about these participants, with annual household incomes below \$20,000, was not available due to the small sample size (USFWS, 2008).

An additional internet search was conducted on August 3, 2009, to determine if information was available about hunting, gathering, and fishing activities. This search yielded no additional information from government or peer-reviewed sources. A popular magazine article dated March 23, 2007 suggested that urban minority populations would be unlikely, at least in the short term, to turn to fishing and hunting as an option for outdoor activities (Frye, 2007).

In addition to the internet search, interviews were conducted with local representatives of government and non-government organizations.

The Pennsylvania Game Commission was contacted on August 3, 2009. One of the licensing representatives said that no data about minority and low-income populations was available. He said that this is the first year in which an electronic licensing program was being utilized. Eventually, he would be able to provide the male and female ratio breakdown, but he does not believe that they would ever ask for "race" or "income" for licensing purposes. He suggested contacting the Hunters Sharing the Harvest Program for additional information about food banks and shelter programs for hunting/fishing.

A representative for Luzerne County for the Hunters Sharing the Harvest Program provided the following information on August 3, 2009:

According to the county representative, each county coordinator is responsible for establishing the connection between the hunters and the butchers. His goal is to try to put new butchers on the list for the organization to process the meat.

Hunters then donate \$15, which is tax deductible, for a start to the processing fee; and the rest of the processing fee is subsidized through the state. The butcher only processes the meat into hamburger (5 lb. bags). This subsidy then would allow for meat to be provided to food banks and shelters for the use in stews, chili, etc. for approximately 200 people. The entire program provides over 200,000 meals a year statewide.

The Luzerne County representative did not have specific information about where the meat is distributed or who participates in the program.

The Columbia County representative for this program also was contacted, but has not worked with the program in several years. He was not able to provide any additional information.

Additional interviews were conducted with the Pennsylvania Game Commission, the Pennsylvania Fish and Boat Commission, the United Way Berwick, the United Way Wyoming Valley Area (Luzerne County), the United Way Columbia County, the Human Services of Columbia County, the Nanticoke Christian Fellowship and Cornerstone Christian Fellowship, and the Commission of Economic Opportunity. No new information was provided.

Other Subsistence

The Central Pennsylvania Food Bank and H&J Weinberg Northeast Pennsylvania Regional Food Bank also were contacted. No new information was provided; the people interviewed suggested looking at published reports for rates of concern about the availability of food (referred to as food insecurity).

Pennsylvania is ranked as 18 with regard to the lowest rate of food insecurity. From 2003-2005, the food insecurity rate (low and very low food security) was 9.8%. Luzerne County is included as part of the service area of the H&J Weinberg Northeast Pennsylvania Regional Food Bank, while Columbia County is included in the service area of Central Pennsylvania Food Bank. In 2006, no state data was collected as to the number of clients served at the food banks in Pennsylvania (America's Second Harvest, 2007).

The Central Pennsylvania Food Bank is headquartered in Harrisburg, Pennsylvania. It began its operations in 1982. It serves a population of 2,730,987. In 2006, the food bank had 159,100 for its annual estimated number of clients served. The median monthly income of its clients was \$950 (America's Second Harvest, 2007).

The H&J Weinberg Northeast Pennsylvania Regional Food Bank is headquartered in Wilkes-Barre, Pennsylvania. It began its operations in 1993. It serves a population of 602,863. In 2006, the food bank had 36,900 for its annual estimated number of clients served. The median monthly income of its clients was \$750 (America's Second Harvest, 2007).

References cited in response:

- America's Second Harvest, 2007. The Almanac of Hunger and Poverty in America 2007. Pennsylvania. Nation's Food Bank Network: Chicago, IL.
- CRPA, 2004: Center for Rural Pennsylvania (CRPA), 2004. Trends in Rural Pennsylvania. The Dirt on Pennsylvania Agriculture. Website accessed on August 12, 2009, <http://www.ruralpa.org/dirttonpaag.pdf>.
- Frye, 2007. Pa. Officials, Industry Leaders Stress Outdoors Participation. Tribune-Review Outdoors. March 23, 2007. Website accessed on August 3, 2009, <http://www.connectoutdoors.state.pa.us/Pa.pdf>.
- PA Farm Link, 2009: Pennsylvania Farm Link, 2009: Beginning Farmers. Website accessed on August 3, 2009, <http://www.pafarmlink.org/beginning.html>.
- STHPLC, 2009: Steps To A Healthier PA Luzerne County, Website accessed April 9, 2009, <http://www.stepstohealthierluzernecounty.org>.
- USDA, 2002b: United States Department of Agriculture (USDA), 2002. Volume 1 Chapter 2: County Level Data. Pennsylvania. Website accessed on August 12, 2009, http://www.agcensus.usda.gov/Publications/2002/Volume_1,_Chapter_2_County_Level/Pennsylvania/index.asp.
- USFWS, 2004: United States Fish and Wildlife Service (USFWS), 2004. Participation and Expenditure Patterns of African-American, Hispanic, and Female Hunters and Anglers. Addendum to the 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. Report 2001-4.
- USFWS, 2008: United States Fish and Wildlife Service (USFWS), 2008. 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. Pennsylvania. FHW/06-PA, Issued April 2008.

COLA Impact:

BBNPP COLA ER Section 2.5.4.3 will be revised as follows in a future revision of the COLA:

2.5.4.3 Subsistence Uses

Subsistence is the use of natural resources as food for consumption and for ceremonial and traditional cultural purposes. Often these types of activities are discussed for minority populations, but sometimes also for low income populations. Subsistence information is often difficult to collect, partially because it is relatively site specific and because it is difficult to differentiate between subsistence uses and recreational uses of natural resources. Often, a number of different informational sources have to be relied upon that collect data via different methods, for different classifications of groups, and for differing types of uses. Thus, it is not possible to present this information for the 50 mi (80 km) and ROI study areas that have been used in previous sections. Common major classifications of subsistence uses include gathering plants for consumption, for medicinal purposes, and use in ceremonial activities; fishing; ~~and~~ hunting; and subsistence farming. These activities are in addition to or replace portions of the foods that might be bought from businesses, and thus can represent reduced costs of living. They also often represent an important part of the cultural identity or lifestyle of the participants. This section presents the subsistence/recreational information that is available from a variety of sources obtained through an internet search.

And BBNPP COLA ER Section 2.5.4.3 will be added as follows in a future revision of the COLA:

2.5.4.3.4 Agriculture

Subsistence farming primarily refers to self-sufficient farming in which producers grow only enough food to feed their family rather than farming for commercial ventures. For purposes of this evaluation, it was assumed that the distribution of farms among minority groups and according to farm size and income may provide some insights as to the relative importance of subsistence farming.

According to the Pennsylvania Farm Link, minority farm operators accounted for only 2.5% of the total farm "operators" in Pennsylvania in 1997 (PA Farm Link, 2009). Fewer than 600 Pennsylvania state farmers, or one percent, are members of minority groups (CRPA, 2004). The term operator designates a person who operates a farm, either doing the work or making day-to-day decisions about such things as planting, harvesting, feeding, and marketing. The operator may be the owner, a member of the owner's household, a hired manager, a tenant, a renter, or a sharecropper. If a person rents land to others or has land worked on by others, he/she is considered the operator only of the land which is retained for his/her own operation (USDA, 2002b).

In 2002, Luzerne County had a total of 548 farms with 809 operators. Of the total number of operators, 776 were white; two were black or African American; two were American Indian or Alaska Natives; two were of Hispanic descent; and three were more than one race. No operators were of Asian, Native Hawaiian, or Pacific Islander descent (USDA, 2002b).

Within Luzerne County, the average farm size was 134 acres, while the median was 80 acres. In the 2002 Agricultural Census, 59 farms were comprised of one to nine acres each (USDA, 2002b).

In 2002, there were 884 farms with 1,221 operators within Columbia County. Of the total operators, 1,201 were white; two were American Indian or Alaska Natives; two were of Hispanic descent; and two were more than one race. No operators were of black, African American, Asian, Native Hawaiian, or Pacific Islander descent (USDA, 2002b).

Within Columbia County, the average farm size was 140 acres, while the median was 86 acres. In the 2002 Agricultural Census, 49 farms were comprised of one to nine acres each (USDA, 2002b).

BBNPP COLA ER Section 2.5.4.6 will be revised as follows in a future revision of the COLA:

2.5.4.6 References

CRPA, 2004: Center for Rural Pennsylvania (CRPA), 2004. Trends in Rural Pennsylvania. The Dirt on Pennsylvania Agriculture. Website accessed on August 12, 2009, <http://www.ruralpa.org/dirttonpaag.pdf>.

PA Farm Link, 2009: Pennsylvania Farm Link, 2009: Beginning Farmers. Website accessed on August 3, 2009, <http://www.pafarmlink.org/beginning.html>.

USDA, 2002a. 2002 Census of Agriculture-County Data, Table 7, Hired Farm Labor-Workers and Payroll, U.S. Department of Agriculture, Website: http://www.nass.usda.gov/census/census02/volume1/pa/st42_2_007_007.pdf, Date accessed: June 2008.

USDA, 2002b: United States Department of Agriculture (USDA), 2002. Volume 1 Chapter 2: County Level Data. Pennsylvania. Website accessed on August 12, 2009, http://www.agcensus.usda.gov/Publications/2002/Volume_1_Chapter_2_County_Level/Pennsylvania/index.asp.

SE 4.4-7**ESRP 4.4.2**

Summary: Provide hourly wage estimates for service-oriented industries as opposed to average salary estimates across all industries and report those. Use operations workforce multiplier for operations workforce employed during construction.

Full Text: Local officials interviewed during the site audit indicated that local service industry wages were far below average statewide wage levels. Thus, wages paid in local service industries would be a more appropriate figure to use relative to average salary estimates across all industries.

Response:**Wage Estimates for Service-Oriented Industries**

Within Luzerne County, the mean earnings were \$52,370 in 2006; for Columbia County, the mean earnings were \$48,437 in 2006.

Service Industries

The following table provides the median hourly, mean hourly, and mean annual salaries of various selected, representative food service, sales, and office/administrative occupations within the Scranton-Wilkes-Barre Metropolitan Area for 2006. This information was not available at the county level, or less, for the ROI. Mean hourly salaries range from \$6.60 to \$15.53 for the selected, representative food service occupations, \$7.28 to \$9.37 for the selected, representative sales occupations, and from \$8.21 to \$14.34 for the selected, representative office/administrative occupations. The median of each of these measures, across these occupations, is as follows: \$8.33 is the median of the "median hourly wages," \$8.59 is the median of the "mean hourly wages," and \$17,870 is the median of the "mean annual salaries."

Service Industry Median and Mean Salaries, 2006

Occupation	Median Hourly	Mean Hourly	Mean Annual
All Occupations	\$12.80	\$15.71	\$32,690
<u>Food Preparation and Serving Related Occupations</u>			
First Line Supervisors/Managers of Food Preparation and Serving Workers	\$15.53	\$15.86	\$32,990
Cooks, Fast Food	\$6.62	\$6.92	\$14,390
Cooks, Restaurant	\$8.33	\$8.95	\$18,620
Cooks, Short Order	\$8.60	\$8.59	\$17,870
Bartenders	\$6.85	\$7.10	\$14,760
Combined Food Preparation and Serving Workers, Including Fast Food	\$6.93	\$7.37	\$15,330
Waiters and Waitresses	\$6.60	\$7.27	\$15,110

Occupation	Median Hourly	Mean Hourly	Mean Annual
Sales and Related Occupations			
Cashiers	\$7.28	\$7.55	\$15,710
Retail Salespersons	\$9.37	\$10.98	\$22,840
Office and Administrative Support Occupations			
Hotel, Motel, and Resort Desk Clerks	\$8.21	\$8.39	\$17,440
Customer Service Representatives	\$12.10	\$12.48	\$25,950
Office Clerks General	\$10.50	\$11.41	\$23,730
Office and Administrative Support Workers, All Other	\$14.34	\$15.77	\$32,790

Source: BLS, 2006.

Construction and Extraction Occupations

Within the Scranton-Wilkes-Barre MSA, mean hourly salaries range from \$11.37 to \$29.54 for selected, representative construction and extraction occupations, as listed in the table below. The median of each of these measures, across these occupations, is as follows: \$18.60 is the median of the "median hourly wages," \$18.70 is the median of the "mean hourly wages," and \$38,895 is the median of the "mean annual salaries."

The following table provides additional details for the Scranton-Wilkes-Barre MSA for construction and extraction occupations:

Construction and Extraction Industry Median and Mean Salaries, 2006

Occupation	Median Hourly	Mean Hourly	Mean Annual
All Occupations	\$12.80	\$15.71	\$32,690
All Construction and Extraction Occupations			
First-Line Supervisors/Managers of Construction Trades and Extraction Workers	\$29.54	\$31.38	\$65,260
Brick masons and Block masons	\$18.11	\$17.56	\$36,510
Carpenters	\$18.09	\$18.13	\$37,720
Cement Masons and Concrete Finishers	\$19.09	\$19.27	\$40,070
Construction Laborers	\$13.20	\$14.87	\$30,920
Operating Engineers and Other Construction Equipment Operators	\$21.47	\$21.32	\$44,350
Electricians	\$23.23	\$22.92	\$47,680
Pipe layers	\$15.38	\$15.12	\$31,450
Plumbers, Pipefitters, and Steamfitters	\$24.16	\$23.34	\$48,550
Sheet Metal Workers	\$21.70	\$21.13	\$43,940
Structural Iron and Steel Workers	\$27.13	\$26.97	\$56,110
Helpers - Carpenters	\$11.37	\$11.55	\$24,020
Helpers - Electricians	\$13.08	\$14.29	\$29,720

Source: BLS, 2006.

Operations Workforce Multiplier for Operations Workforce Employed During Construction

The new BBNPP unit will require 363 operational personnel upon completion of construction and initiation of full operation. In order to plan and undertake preliminary commissioning and operational activities, it is anticipated that approximately 100 of these operational personnel will be on-site during the first two years of construction, and all 363 personnel will be on-site during the remaining four years of construction. As a result, there will be an overlap of approximately four years during which the full contingent of 363 operational personnel will be on-site with the construction personnel, including the period of peak construction activity. Additionally, based on an indirect multiplier for operations of 1.9011 as noted in ER Table 5.8-2, 690 indirect jobs would also be created during the last four years of construction as a result of the operational workforce:

$$363 \text{ direct operational jobs} \times 1.9011 \text{ indirect multiplier} = 690 \text{ indirect jobs.}$$

As discussed in ER Section 5.8.2.3 and detailed in ER Table 5.8-2, it is assumed that 87.1% of the 363 operational personnel, or 316 workers, will in-migrate into the two-county ROI based upon the existing SSES operational workforce. Approximately 42.3% of the existing SSES operational workforce resides in Luzerne County and 44.8% resides in Columbia County. Therefore, of the estimated 316 operational workers who will in-migrate, approximately 154 workers and their families will in-migrate into Luzerne County and 163 workers and their families will in-migrate into Columbia County. It is further assumed that 87.1% of indirect workers, or 601 workers, would also reside within the ROI, and the indirect workforce would be distributed between Columbia and Luzerne Counties in a pattern similar to that of the direct workforce. However, since the spouses of direct workers would likely fill a number of the indirect employment opportunities, it is estimated that there will only be 114 indirect worker households in Luzerne County and 121 indirect worker households in Columbia County, or a total of approximately 234 in the ROI.

Operational personnel will have an average salary of \$77,135 annually. This will amount to approximately \$28 million in direct annual salaries overall, excluding benefits, during the last four years of construction prior to the operation of BBNPP, and \$24.4 million within the ROI. Additionally, based on the information presented previously for selected, representative service wages in the Scranton-Wilkes-Barre MSA, the annual salary for indirect workers is estimated to be \$17,870, which will generate approximately \$12.3 million in indirect annual wages overall, and \$10.7 million within the ROI.

Additional state income and sales taxes will be generated within the ROI by the 316 in-migrating residents from the operations workforce and the 601 indirect workers. As shown in the response to RAI SE 4.4-10, in 2006 the Commonwealth of Pennsylvania collected \$10,261.6 million in income taxes. Based upon 4,845,603 total households in the state, this amounts to approximately \$2,118 annually per household (USCB, 2006b). This would result in an additional \$669,288 annually in income taxes from the households of direct operational workers and \$495,612 from the households of indirect workers.

In 2006-2007, the state collected \$8,590.8 million from sales tax (PDR, 2008). Based upon the total number of households in 2006 (4,845,603) (USCB, 2006b), approximately \$1,773 in sales taxes will be generated annually per household. Within the ROI, this will result in an additional \$560,268 annually from the direct operational workers and \$405,522 from the indirect workers.

Assuming that in-migrants occupy new homes, real estate taxes for the in-migrating population can be estimated based upon the current revenues generated in Luzerne and Columbia

Counties. For Luzerne County, revenue generated from real estate taxes was \$72,398,609 as shown in ER Table 2.5-26. In 2006, the total number of households was 130,034 (USCB, 2006c). Based upon the amount of revenue generated and the population, approximately \$556.77 is generated annually per household. Using the 2006 estimates, and excluding any in-migrating indirect workers, approximately \$85,743 would be generated annually in real estate taxes from the 154 direct workers and their families in Luzerne County. However, it is likely that only a portion of this potential increase in real estate taxes would be realized, because most of the housing needs of the in-migrating workers and their families will be satisfied by the existing supply of housing units, which is currently subject to real estate tax, and in-migration associated with BBNPP would likely have little impact on property values as discussed in ER Sections 4.4.2.4 and 5.8.2.2.

As shown in ER Table 2.5-27, revenue generated from real estate taxes was \$5,521,606 in Columbia County. In 2006, the total number of households was 25,302 (USCB, 2006d). Based upon the amount of revenue generated and the population, approximately \$218.23 is generated annually per household. Using these estimates, and excluding any in-migrating indirect workers, approximately \$35,571 in real estate taxes would be generated annually from the 163 direct workers and their families residing in Columbia County. However, it is likely that only a portion of this potential increase in real estate taxes would be realized, because most of the housing needs of the in-migrating workers and their families will be satisfied by the existing supply of housing units, which is currently subject to real estate tax, and in-migration associated with BBNPP would likely have little impact on property values as discussed in ER Sections 4.4.2.4 and 5.8.2.2.

The following table provides a summary of this information:

Potential Annual Income, Sales, and Real Estate Taxes Generated in the ROI by the Initial Operational Workforce During Construction

Taxes/Jurisdictions	Operational Workers In-Migration	Indirect Workers
Households		
Luzerne County	154	114
Columbia County	163	121
Total*	316	234
Income Taxes		
Luzerne County	n/a	n/a
Columbia County	n/a	n/a
State Total	\$669,288	\$495,612
Sales Taxes		
Luzerne County	n/a	n/a
Columbia County	n/a	n/a
State Total	\$510,268	\$405,522
Real Estate Taxes**		
Luzerne County	\$85,743	n/a
Columbia County	\$35,511	n/a
State Total	n/a	n/a

* Totals are not exact due to rounding (See ER Table 5.8-2).

** Assumes in-migrating workers occupy new homes.

References cited in response:

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- PDR, 2008. Pennsylvania Department of Revenue (PDR), 2008. Commonwealth of Pennsylvania: 2008-2009 Budget in Brief. Website accessed on August 4, 2009, <http://www.portal.state.pa.us/portal/server.pt?open=512&objID=4571&mode=2#2008-09>.
- USCB, 2006a. United States Census Bureau (USCB), 2006. ACS Demographic and Housing Estimates: 2006. Pennsylvania. Website accessed on August 4, 2009, http://factfinder.census.gov/servlet/ADPTable?_bm=y&-state=adp&-context=adp&-qr_name=ACS_2006_EST_G00_DP5&-ds_name=ACS_2006_EST_G00_&-tree_id=306&-redoLog=false&-_caller=geoselect&-geo_id=04000US42&-format=&-_lang=en.
- USCB, 2006b. United States Census Bureau (USCB), 2006. Selected Social Characteristics in the United States: 2006. 2006 American Community Survey. Pennsylvania. Website accessed on August 4, 2009, http://factfinder.census.gov/servlet/ADPTable?_bm=y&-state=adp&-context=adp&-qr_name=ACS_2006_EST_G00_DP2&-ds_name=ACS_2006_EST_G00_&-tree_id=306&-redoLog=false&-_caller=geoselect&-geo_id=04000US42&-format=&-_lang=en.
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- USCB, 2006d. S1101- Households and Families. 2006 American Community Survey. Columbia County, Pennsylvania. Website accessed on August 18, 2009, http://factfinder.census.gov/servlet/STTable?_bm=y&-context=st&-qr_name=ACS_2006_EST_G00_S1101&-ds_name=ACS_2006_EST_G00_&-tree_id=306&-redoLog=true&-_caller=geoselect&-geo_id=05000US42037&-format=&-_lang=en

COLA Impact:

BBNPP COLA ER Section 4.4.2 will be revised as follows in a future revision of the COLA:

4.4.2.3 Demography

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

In addition, it is estimated that a maximum of 954 indirect jobs would be created within the ROI under the 20% scenario and 1,670 indirect workforce jobs would be created under the 35% scenario (multiplying 3,440 ROI peak direct workers by the BEA indirect employment/economic multiplier of 1.3866, (BEA, 2008)). An estimated 532 to 930 indirect jobs located within the ROI could be filled by the spouses and other family members of the direct workforce. The remaining 423 to 739 indirect jobs likely would be filled by existing unemployed residents, a maximum of 7.0% of the 10,491 unemployed within the ROI in 2006, underemployed area residents, or new in-migrants. If all of these remaining indirect jobs were filled by new immigrants, it would only represent 278 to 486 households with 688 to 1,205 people.

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

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

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

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

4.4.2.4 Housing

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

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

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

In addition to the above housing units, there are a total of 68 apartment and townhouse complexes providing one to three bedroom rental units in the ROI. Most of these facilities are located in Luzerne County, including 50 apartment and townhouse complexes. These rental complexes could be used to house part of the in-migrating workforce and might be a viable option to purchasing more costly single-family homes.

Weekly or monthly commuters might elect to stay at one of the 96 hotels/motels/B&Bs facilities, providing about 3,674 rooms for rent in the ROI. Luzerne County has 49 hotel/motel facilities with 2,353 rooms and Columbia County has 47 facilities with 1,321 rooms. Because the hotels and motels are operating at or near capacity during the summer vacation season, from about April through August (see Section 2.5.2), the portions of the workforce that might want to stay on a weekly or monthly basis and then commute home might compete with existing users. During the remainder of the year, enough units would likely be available to meet the needs of the weekly or monthly commuters.

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

4.4.2.5.2 Two-County Region of Influence

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

It is estimated that the direct construction workforce would receive average salaries of \$34.00/ hour/worker (two-thirds of the estimated \$50 per hour, including benefits), or about \$70,720 annually. This would result in an annual salary expenditure, for the peak construction workforce of 3,950 people, of \$279.3 million. The average annual salary for the direct workforce would be significantly more than the \$52,370 mean earnings in Luzerne County in 2006 and the \$48,437 mean earnings in Columbia County. Based upon the peak 35% scenario immigration levels, Luzerne County would experience an estimated \$41.4 million increase in annual income during peak construction and Columbia County would receive an estimated \$43.8 million annually. The construction workforce also will have the opportunity to receive overtime pay at a rate of 1.5 times the wage rate for all hours over 40 per week. As previously indicated, the average wage rate per hour is \$34.00 per hour with an average annual salary of \$70,720. This is based on the assumption of a 40 hour work week. The construction workforce has the potential to earn up to 20 hours per work in overtime pay. Over the course of one year, this would amount to an additional 1,040 hours of work. The average rate for overtime pay is \$51.00 per hour. At this rate, a construction worker could earn an additional \$53,040, or a total of \$123,760 annually.

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

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

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

~~Assuming that the average indirect worker earned \$52,370 annually, the average earnings in Luzerne County in 2006, the 954 indirect workers under the 20% scenario would generate \$50 million in additional annual salaries within the ROI, and the 1,670 indirect workers under the 35% scenario would generate \$87.4 million in additional annual salaries. The additional direct and indirect workforce income would result in additional expenditures and economic activity in the ROI. Construction of SSES was noted to have benefited restaurants; car dealerships; golf courses/clubs; sand, gravel, and aggregate businesses; firms providing nitrogen and oxygen gases; lumber suppliers; and other similar businesses. Because of the overall significant number of construction and indirect jobs that would be created, existing lower income levels found in the ROI, and the general out-migration occurring (an indicator of lower economic opportunity), the beneficial impacts to employment and income from construction of the BBNPP facility would be MODERATE, and would not require mitigation.~~

Note: *This text reflects changes made in response to BBNPP ER RAI SE 4.4-10 as well.*

4.4.2.6.2 Two-County Region of Influence

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

during construction will represent a significant increase in revenues for Salem Township, the Berwick Area School District, and Luzerne County.

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

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

~~Additional state and local income taxes would be generated by the in-migrating residents, although the amount cannot be estimated because of the variability of investment income, retirement contributions, tax deductions taken, applicable tax brackets, and other factors. It is estimated that Luzerne County would experience a \$41.4 million increase in annual wages from the direct workforce. Columbia County would experience an estimated annual increase of \$43.8 million from the direct workforce. Relative to the existing total wages for the ROI, it is concluded that the potential increase in income taxes represent a SMALL economic benefit to the jurisdictions.~~

Additional state income taxes would be generated by the in-migrating residents. Although the amount cannot be accurately estimated because of the variability of investment income, retirement contributions, tax deductions taken, applicable tax brackets, and other factors, tax revenue data from the Pennsylvania Department of Revenue can be used to project potential tax revenue impacts within the ROI. In 2006, the State of Pennsylvania collected \$10,261.6 million in income taxes. Based on the 2006 total number of households (4,845,603), this amounts to approximately \$2,118 annually per household. As indicated in Tables 4.4-7 and 4.4-8, a peak of 3,950 direct construction employees will build BBNPP. Under the 20% in-migration scenario, an estimated 688 workers and their families will locate within the ROI. Based upon this amount, approximately \$1,457,184 will be generated annually in income taxes by the 688 households. Under the 35% in-migration scenario, an estimated 1,204 workers and their families will locate within the ROI. Therefore, approximately \$2,550,072 will be generated annually in income taxes by the 1204 households.

As with the 50 mi (80 km) comparative geographic area, additional sales taxes also would be generated within the ROI by the power plant and the in-migrating residents. However, these purchases would be much smaller within the ROI. The amount of increased sales tax revenues generated by the in-migrating residents would depend upon their retail purchasing patterns, but would only represent a small benefit to this revenue stream for the Commonwealth of Pennsylvania. The amount of increased sales tax revenues generated by the in-migrating residents would depend upon their retail purchasing patterns, but would

only represent a small benefit to this revenue stream for the Commonwealth of Pennsylvania. In 2006-2007, the state collected \$8,590.8 million from sales tax (PDR, 2008). Based upon the 2006 total number of households (4,845,603), approximately \$1,773 in sales taxes will be generated annually per household (USCB, 2006b and c). As indicated in Tables 4.4-7 and 4.4-8, a peak of 3,950 direct construction employees will build BBNPP. Under the 20% in-migration scenario, an estimated 688 workers and their families are expected to in-migrate into the ROI. Based upon this amount, approximately \$1,219,824 in annual sales taxes will be generated by the 688 households. Under the 35% in-migration scenario, an estimated 1,204 workers and their families are expected to in-migrate into the ROI. Therefore, approximately \$2,134,692 in annual sales taxes will be generated by the 1,204 households.

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

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

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

4.4.2.10 References

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BBNPP COLA ER Section 5.8.2 will be revised as follows in a future revision of the COLA:

5.8.2.3 Employment and Income

As stated earlier, it is estimated that a total of 363 direct employees would be added to the onsite workforce to operate BBNPP, and a maximum of 690 indirect job opportunities would be created in the state assuming a worst-case scenario that all indirect jobs would be filled by new in-migrants rather than by existing unemployed or underemployed residents. As stated above, of this total an estimated 316 direct workers (87%) and 601 indirect workers would reside within the Luzerne and Columbia County region of influence. The 917 direct and indirect ROI jobs would result in a noticeable, but SMALL, impact to the area economy, representing a 0.5% increase in the 151,869 total labor force in Luzerne County in 2000 and the 32,403 total labor force in Columbia County (USCB, 2000b).

It is estimated that PPL Bell Bend, LLC would spend \$28 million annually on salaries (in 2005 dollars, an average of \$77,135/year/worker for direct labor, excluding benefits). The BBNPP estimated average annual salary is significantly greater (over 47% more) than the \$52,370 mean earnings in Luzerne County in 2006 (USCB, 2006a) and 59% more than the \$48,437 mean earnings in Columbia County (USCB, 2006b). If income is distributed similar to the direct workforce in-migration pattern, Luzerne County would experience an estimated \$11.8 million increase in annual income and Columbia County would receive an estimated \$12.5 million annually.

Assuming that the average indirect worker earned \$17,870, which is the 2006 median of average annual income for service workers in selected occupations in the Scranton-Wilkes-Barre MSA (BLS, 2006), the 292 person indirect workforce migrating into Luzerne County would generate \$5.2 million in annual income, and the 309 person indirect workforce migrating into Columbia County would generate \$5.5 million in annual income. Assuming that the indirect workforce would have annual salaries of \$52,370 (based on the 2006 mean earnings in Luzerne County (USCB, 2006a), the 292 indirect workforce migrating into Luzerne County would generate over \$15.3 million in income and the 309 indirect workforce migrating into Columbia County would generate \$16.2 million in household income. This additional income would result in additional expenditures and economic activity in the ROI. However, it would represent a small percentage of overall total income in the ROI. Thus, it is concluded that the impacts to employment and income would be SMALL, and would not require mitigation (USCB, 2006a).

5.8.2.8 References

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

SE 4.4-8**ESRP 4.4.2**

Summary: Provide a revision of average annual salaries that includes overtime.

Full Text: None

Response: For the BBNPP, overtime will be paid at 1.5 times the current rates for time over 40 hours per week. Approximately 60 hours per week will be allowed, which includes 40 hours at the regular rate and 20 hours at the overtime rate.

As shown in ER Section 4.4.2.5.2, the average salary for construction workers is \$70,720 annually. This amounts to approximately \$34.00 per hour per worker, excluding benefits. The total number of working hours in a year is 2,080 hours, or 40 hours for 52 weeks.

The overtime salary would amount to an average \$51.00 per hour per worker, excluding benefits. If a worker were to compile 20 hours per week in overtime, an additional 1,040 hours for the year would be gained at the overtime rate. The earning for this overtime work is \$53,040.

Therefore, a construction worker potentially could earn up to an average of \$123,760.

The following table summarizes this information:

	Regular	Overtime	Total
Hours Per Week	40	20	60
Hours Per Year	2,080	1,040	3,120
Salary Per Hour	\$34	\$51	Not Applicable
Annual Salary	\$70,720	\$53,040	\$123,760

Typically, concrete workers work 6 days a week at 10 hours per day, with 2 shifts. The turbine island steel erection requires a day shift only of 6 days per week at 10 hours per day. Other work is performed 4 days a week at 10 hours a day and 1 day a week at 8 hours a day, with 2 shifts.

COLA Impact:

BBNPP COLA ER Section 4.4.2.5.2 will be revised as follows in a future revision of the COLA:

4.4.2.5.2 Two-County Region of Influence

Direct construction workforce employment is already discussed in the demography section above. In addition to the 3,950 direct workforce, a peak of 954 indirect workforce jobs would be created in the ROI under the 20% scenario and 1,670 indirect jobs would be created under the 35% scenario (Table 4.4-7 and Table 4.4-8). This would result in a peak increase of 1,642 to 2,874 employed people in the ROI, depending upon the scenario selected. The peak increase in employment would range from 797 to 1,396 people in Luzerne County and 845 to 1,478 people in Columbia County. Unemployed or underemployed members of the

labor force could benefit from these increased employment opportunities, to the extent that they have the craft skills required (e.g., laborers, carpenters, electricians, plumbers, welders) and are hired as part of the construction workforce. These increases would result in a noticeable but small impact to the area economy, representing a maximum 0.9% increase in the 151,869 total labor force in Luzerne County in 2000 and 4.6% in the 32,403 total labor force in Columbia County (USCB, 2000).

It is estimated that the direct construction workforce would receive average salaries of \$34.00/ hour/worker (two-thirds of the estimated \$50 per hour, including benefits), or about \$70,720 annually. This would result in an annual salary expenditure, for the peak construction workforce of 3,950 people, of \$279.3 million. The average annual salary for the direct workforce would be significantly more than the \$52,370 mean earnings in Luzerne County in 2006 and the \$48,437 mean earnings in Columbia County. Based upon the peak 35% scenario immigration levels, Luzerne County would experience an estimated \$41.4 million increase in annual income during peak construction and Columbia County would receive an estimated \$43.8 million annually. The construction workforce also will have the opportunity to receive overtime pay at a rate of 1.5 times the wage rate for hours over 40 per week. As previously indicated, the average wage rate per hour is \$34.00 per hour with an average annual salary of \$70,720. This is based on the assumption of a 40 hour work week. The construction workforce has the potential to earn up to 20 hours per week in overtime pay. Over the course of one year, this would amount to an additional 1,040 hours of work. The average rate for overtime pay is \$51.00 per hour. At this rate, a construction worker could earn an additional \$53,040, or a total of \$123,760 annually.

In addition, the working spouses of the direct construction workers, who filled indirect jobs created by the power plant, would contribute substantially to individual household incomes.

SE 4.4-10ESRP 4.4.2

Summary: *Provide estimates of sales or income tax generated by the BBNPP construction workforce.*

Full Text: Several revenue streams to local jurisdictions will be generated through the construction of the BBNPP. Real estate, income, sales, and other tax receipts will also be generated through wages and salaries earned by the construction workforce and the homes they build or purchase. Provide estimates of these taxes to the region and to the proximate communities.

Response:Annual Income Taxes

In 2006-2007, the actual statewide collections from personal income tax were \$10,261.6 million (PDR, 2008). Based upon a 2006 statewide population of 12,440,621 (USCB, 2006a), this would amount to approximately \$825 annually per person; or based upon the 2006 total number of households (4,845,603) (USCB, 2006b), \$2,118 annually per household (USCB, 2006a and b).

As indicated in ER Tables 4.4-7 and 4.4-8, a peak of 3,950 direct construction employees will build the BBNPP. Under the 20% in-migration scenario, an estimated 688 workers and their families are expected to in-migrate into the ROI. Based upon this amount, approximately \$1,457,184 will be generated annually in income taxes by the 688 households. Under the 35% in-migration scenario, an estimated 1,204 workers and their families are expected to in-migrate into the ROI. Based upon this amount, approximately \$2,550,072 will be annually generated in income taxes by the 1,204 households.

Annual Sales Taxes

In 2006-2007, the actual collections from state sales tax were \$8,590.8 million (PDR, 2008). Based upon a 2006 statewide population of 12,440,621, this would amount to approximately \$690.54 annually per person; or based upon the 2006 total number of households (4,845,603), \$1,773 annually per household (USCB, 2006a and b).

As indicated in ER Tables 4.4-7 and 4.4-8, a peak of 3,950 direct construction employees will build the BBNPP. Under the 20% in-migration scenario, an estimated 688 workers and their families are expected to in-migrate into the ROI. Based upon this amount, approximately \$1,219,824 will be generated annually in sales taxes by the 688 households. Under the 35% in-migration scenario, an estimated 1,204 workers and their families are expected to in-migrate into the ROI. Based upon this amount, approximately \$2,134,692 in sales taxes will be generated annually by the 1,204 households.

Annual Real Estate Taxes

Real estate taxes are collected by the individual counties. As shown in ER Section 4.4.2.6.2, PPL Susquehanna, LLC paid approximately \$1.2 million in real estate taxes to Luzerne County and approximately \$2.7 million in real estate taxes to the Berwick Area School District.

Real estate taxes from individual property owners can be estimated based upon current revenues generated in Luzerne County. As shown in ER Table 2.5-26, total county revenue generated from real estate taxes was \$72,398,609. In 2006, the population estimate for Luzerne County was 313,020, as indicated in ER Table 2.5-4 (USCB, 2006c). The total number of households was 130,034 in 2006 (USCB, 2006d). Based upon the amount of revenue generated and the population, approximately \$231.29 is generated annually per person or \$556.77 annually per household.

As stated in ER Section 4.4.2.4, there is adequate existing vacant housing available to meet the needs of the assumed in-migrating construction workforce and their families. The owners of these units are already paying real estate taxes for these vacant units. Therefore, it is expected that no new real estate tax revenues would be generated by the in-migrating construction workforce for BBNPP.

However, if one were to assume that new potential in-migrants to Luzerne County were to occupy new homes, using the average of \$556.77 of real estate taxes paid annually per household and 334 workers and their families (i.e., 334 households) under the 20% in-migration, approximately \$185,961 will be generated annually in additional real estate taxes. Under the 35% in-migration to Luzerne County, using the average of \$556.77 of real estate taxes paid per household and 585 workers and their families (i.e., 585 households), approximately \$325,710 will be generated annually in additional real estate taxes.

Real estate taxes for the individuals can be estimated based upon current revenues generated in Columbia County. As shown in ER Table 2.5-27, total revenue generated from real estate taxes was \$5,521,606. In 2006, the population estimate for Columbia County was 65,014, as indicated in ER Table 2.5-4 (USCB, 2006e). The total number of households was 25,302 in 2006 (USCB, 2006f). Based upon the amount of revenue generated and the population, approximately \$84.93 is generated annually per person or \$218.23 annually per household.

Using this amount for the 20% in-migration, approximately \$74,569 will be generated annually by the workers moving into Columbia County (878 total people). As previously indicated, there is enough vacant housing to meet the in-migration needs, but if there were 354 workers and their families occupying new homes in Columbia County (i.e., 354 households), approximately \$77,253 will be generated annually in additional real estate taxes.

Using this amount for the 35% in-migration, approximately \$130,452 will be generated by the workers moving into Columbia County (1,536 total people). Once again, there is enough vacant housing to meet the in-migration needs, but if there were 619 workers and their families occupying new homes in Columbia County (i.e., 619 households), approximately \$135,084 will be generated in additional real estate taxes.

The table shown below provides a summary of the information presented regarding potential annual income, sales, and real estate taxes for the 20% and 35% construction in-migration scenarios.

**Potential Annual Income, Sales, and Real Estate Taxes Generated
in the ROI During Construction**

Taxes/Jurisdictions	20% In-Migration	35% In-Migration
Households		
Luzerne County	334	585
Columbia County	354	619
Total	688	1,204
Income Taxes		
Luzerne County	n/a	n/a
Columbia County	n/a	n/a
State Total	\$1,457,184	\$2,550,072
Sales Taxes		
Luzerne County	n/a	n/a
Columbia County	n/a	n/a
State Total	\$1,219,824	\$2,134,692
Real Estate Taxes*		
Luzerne County	\$185,961	\$325,710
Columbia County	\$77,253	\$135,084
State Total	n/a	n/a

* Assumes in-migrating workers occupy new homes

References cited in response:

- BLS, 2006. Bureau of Labor Statistics (BLS), 2006. May 2006 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates. Scranton-Wilkes Barre, PA. Website accessed on August 3, 2009, http://www.bls.gov/oes/2006/may/oes_42540.htm.
- PDR, 2008. Pennsylvania Department of Revenue (PDR), 2008. Commonwealth of Pennsylvania: 2008-2009 Budget in Brief. Website accessed on August 4, 2009, <http://www.portal.state.pa.us/portal/server.pt?open=512&objID=4571&mode=2#2008-09>.
- USCB, 2006a. United States Census Bureau (USCB), 2006. ACS Demographic and Housing Estimates: 2006. Pennsylvania. Website accessed on August 4, 2009, http://factfinder.census.gov/servlet/ADPTable?_bm=y&-state=adp&-context=adp&-qr_name=ACS_2006_EST_G00_DP5&-ds_name=ACS_2006_EST_G00_&-tree_id=306&-redoLog=false&-_caller=geoselect&-geo_id=04000US42&-format=&-_lang=en.
- USCB, 2006b. United States Census Bureau (USCB), 2006. Selected Social Characteristics in the United States: 2006. 2006 American Community Survey. Pennsylvania. Website accessed on August 4, 2009, http://factfinder.census.gov/servlet/ADPTable?_bm=y&-state=adp&-context=adp&-qr_name=ACS_2006_EST_G00_DP2&-

ds_name=ACS_2006_EST_G00_&-tree_id=306&-redoLog=false&-_caller=geoselect&-geo_id=04000US42&-format=&-_lang=en.

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

USCB, 2006d. S1101- Households and Families. 2006 American Community Survey. Luzerne County, Pennsylvania. Website accessed on August 18, 2009, http://factfinder.census.gov/servlet/STTable?_bm=y&-context=st&-qr_name=ACS_2006_EST_G00_S1101&-ds_name=ACS_2006_EST_G00_&-tree_id=306&-redoLog=true&-_caller=geoselect&-geo_id=05000US42079&-format=&-_lang=en.

USCB, 2006e. United States Census Bureau (USCB), 2006. ACS Demographic and Housing Estimates: 2006. Columbia County, Pennsylvania. Website accessed on August 4, 2009, http://factfinder.census.gov/servlet/ADPTable?_bm=y&-state=adp&-context=adp&-qr_name=ACS_2006_EST_G00_DP5&-ds_name=ACS_2006_EST_G00_&-tree_id=306&-redoLog=true&-_caller=geoselect&-geo_id=05000US42037&-format=&-_lang=en.

USCB, 2006f. S1101- Households and Families. 2006 American Community Survey. Columbia County, Pennsylvania. Website accessed on August 18, 2009, http://factfinder.census.gov/servlet/STTable?_bm=y&-context=st&-qr_name=ACS_2006_EST_G00_S1101&-ds_name=ACS_2006_EST_G00_&-tree_id=306&-redoLog=true&-_caller=geoselect&-geo_id=05000US42037&-format=&-_lang=en.

COLA Impact:

BBNPP COLA ER Sections 4.4.2 and 4.4.3 will be revised as follows in a future revision of the COLA:

Note: *This text reflects changes made in response to BBNPP ER RAI SE 4.4-7 as well.*

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, 20062006a). 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.

4.4.2.6.2 Two-County Region of Influence

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

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

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

~~Additional state and local income taxes would be generated by the in-migrating residents, although the amount cannot be estimated because of the variability of investment income, retirement contributions, tax deductions taken, applicable tax brackets, and other factors. It is estimated that Luzerne County would experience a \$41.4 million increase in annual wages from the direct workforce. Columbia County would experience an estimated annual increase of \$43.8 million from the direct workforce. Relative to the existing total wages for the ROI, it is concluded that the potential increase in income taxes represent a SMALL economic benefit to the jurisdictions.~~

Additional state income taxes would be generated by the in-migrating residents. Although the amount cannot be accurately estimated because of the variability of investment income, retirement contributions, tax deductions taken, applicable tax brackets, and other factors, tax revenue data from the Pennsylvania Department of Revenue can be used to project potential tax revenue impacts within the ROI. In 2006, the Commonwealth of Pennsylvania collected \$10,261.6 million in income taxes. Based on the 2006 total number of households (4,845,603), this amounts to approximately \$2,118 annually per household. As indicated in Tables 4.4-7 and 4.4-8, a peak of 3,950 direct construction employees will build BBNPP. Under the 20% in-migration scenario, an estimated 688 workers and their families will locate within the ROI. Based upon this amount, approximately \$1,457,184 will be generated annually in income taxes by the 688 households. Under the 35% in-migration scenario, an estimated 1,204 workers and their families will locate within the ROI. Therefore, approximately \$2,550,072 will be generated annually in income taxes by the 1204 households.

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

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

It is estimated that Luzerne County will experience a \$41.4 million increase in annual wages from the direct construction workforce and \$11.8 million from the direct operational workforce. Columbia County would experience an estimated annual increase of \$43.8 million from the direct construction workforce and \$12.5 million from the direct operational workforce. Relative to the existing total wages for the ROI, it is concluded that the potential increase in income taxes represent a SMALL economic benefit to the jurisdictions.

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

4.4.2.10 References

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

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

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

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

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

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

SE 4.4-14**ESRP 4.4.2**

Summary: *Please provide more discussion of the possible pathways associated with subsistence fishing activities and the impact of emissions from vehicles on minority and low-income workers.*

Full Text: None

Response:**Fishing**

Low income and minority populations could be affected through the absorption of contaminated resources via drinking, food consumption, and inhalation. Subsistence farming, fishing and hunting may be contributing food sources. ER Section 2.5.4.3.3 identifies the locations within Luzerne and Columbia counties used for fishing. In Luzerne County, these areas include Harris Pond, Lily Lake, Mountain Springs Lake, Frances Slocum Lake, Frances E. Walter Reservoir, Moon Lake, Lake Frances, Nescopeck Creek, Lake Jean, and the Susquehanna River. In Columbia County Briar Creek Lake and the Susquehanna River are locations used for fishing. ER section 2.2.3 provides locations of state and local recreational and game lands potentially used for hunting.

Recreational/subsistence impacts from fishing and fish consumption, as described in ER Section 4.2.2.7, is typically attributable to the spill and/or discharge of chemical compounds into surface waters. Residual contaminants in sediment and fish often result in the establishment of consumption advisories for selected fish species. Currently, advisories for mercury and PCBs have been issued for sections of the Susquehanna River including Luzerne and Columbia Counties (PA DEP, 2009). Fish species covered by the advisory include smallmouth bass, suckers, catfish and carp. Potential impacts to aquatic resources could also occur from construction related turbidity in waterbodies to the extent that sediments are suspended or other contaminants are released.

Whether minority and low income populations are disproportionately affected by consumption of fish included in the advisories or affected by release of sediments can be implied from the distribution of anglers by minority class. No direct information was found discriminating between anglers along the Susquehanna River or in nearby lakes but in general, national angler survey data show that minority anglers represent only a small percentage of the population of sports persons. The U.S. Fish and Wildlife Service (USFWS, 2004) reported that subpopulations of anglers "participate at remarkably lower rates than the population as a whole for general fishing and freshwater fishing". Of the subpopulations, women had the highest participation rate (8%), while African-American and Hispanics each had a participation rate of 7%. Comparable data for the Commonwealth of Pennsylvania were not available because the overall participation and reporting by minorities was so low (USFWS, 2008). Therefore, minority and low income populations are not expected to be disproportionately affected by consumption of fish in the vicinity of the proposed BBNPP site.

Emissions

Impacts from transportation emissions specific to one population group typically concern access to transportation and amount of traffic. Although impacts could be associated with job classes

who disproportionately work at certain activities that require use of vehicles on the job. Access related issues often include ability to get to jobs, better transit service, and clean vehicles. The lack of clean vehicles may be a cause of greater emissions in low income and minority groups; as at times, diesel buses travel through these areas at a greater rate than through others due to the need for this type of travel (CRCG, 2007). Whether minority and low income construction workers are disproportionately impacted can be ascertained from labor statistics. The U.S. Bureau of Labor Statistics (BLS, 2009) indicates that in 2008 the national construction workforce consisted of approximately 90% whites, 5.6% African-American and 1.6% Asian. The U.S. Census Bureau (USCB, 2009) data show that the distribution for these classes in the 2005-07 U.S. population estimates was 10.4% African American and 2.3% Asian. It is reasonable to assume that the workforce at BBNPP will be typical of that found nationally, and therefore, there will be no disproportionate impact to minority and low income workers.

Researchers have demonstrated that the primary association between emissions impacts and low-income/minority populations is the amount of vehicular traffic and distance of setbacks associated with either residences or facilities. These studies have shown that siting is an important consideration for residential areas and in particular, for facilities associated with children, such as for schools. Most often in urban areas, low-income and minority populations tend to be located in high traffic areas that do not have sufficient setbacks from the roadways (Green et. al., 2004 and Meng, et. al., 2006). Other studies show similar results (Finkelstein, et. al., 2004 and Kim, et. al., 2004). Given the relatively low occurrence of minority and low income in the vicinity of the proposed BBNPP site, these impacts are expected to be small or non-existent.

References cited in response:

- CRCG, 2007. Capital Regional Council of Governments (CRCG), 2007. Capitol Region Transportation Plan. Environmental Justice Adopted April 25, 2007. Website accessed on August 10, 2009, http://www.crcog.org/transportation/regional_plan.html.
- Finkelstein, et. al., 2004. Finkelstein, Murray M., Michael Jerrett, and Malcolm Sears, 2004. Traffic Air Pollution and Mortality Rate Advancement Periods. American Journal of Epidemiology, Vol.160:173-177. Website accessed on August 10, 2009, <http://aje.oxfordjournals.org/cgi/content/full/160/2/173>.
- Green, et. al., 2004. Green, Rochelle S., Svetlana Smorodinsky, Janice J. Kim, Robert McLaughlin, and Bart Ostro, 2004. Proximity of California Public Schools to Busy Roads. Environmental Health Perspectives. Vol. 112 (1) January 2004. Website accessed on August 10, 2009, <http://www.pubmedcentral.nih.gov/picrender.fcgi?artid=1241798&blobtype=pdf>.
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COLA Impact:

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

SE 5.8-1**ESRP 5.8.2**

Summary: *Provide an assessment of local housing impacts that does not assume the indirect workforce in-migrates into the ROI.*

Full Text: None

Response: Assuming that all of the indirect workforce does not in-migrate, implies that indirect jobs would be taken by unemployed persons within the ROI. If this is the case, there is no impact on housing since these people already reside within the ROI and occupy existing housing. There is also no added impact if spouses of the incoming operations workforce take some of the jobs because they would already be residing there and counted among the households in-migrating.

COLA Impact:

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

Enclosure 3

RAI H 2.3-1
Susquehanna River Withdrawal Data
(MS Excel & Portable Document Format)
Luzerne County Pennsylvania
(One Compact Disc)

Enclosure 4

RAI H 2.3-1

Susquehanna Steam Electric Station/Susquehanna River Basin Commission
Extended Power Uprate Files
Luzerne County Pennsylvania



Susquehanna River Basin Commission

a water management agency serving the Susquehanna River Watershed

PROJECT INFORMATION

1. Applicant Information:

Applicant Name or Registered Fictitious Name PPL Susquehanna, LLC
Parent Corporation Name, if different PPL Corporation
Mailing Address Two North Ninth Street
GENPL5
City Allentown State PA Zip 18101-1179
Contact Person Jerome S. Fields, REM Title Sr. Environmental Scientist - Nuclear
Telephone (610) 774-7889 Fax (610) 774-7782 E-Mail jsfields@pplweb.com

2. Preparer (Hydrogeologist/Engineer):

Name Jan C. Phillips, P.E.
Title _____
Company Jan C. Phillips, P.E.
Address 2611 Walnut Street
Allentown, PA 18104-0160
Phone (610) 821-0160 Fax (610) 821-0160
Signature *Jan C. Phillips*
Date 12-19-06 E-Mail Address jcphllps@enter.net

3. Project Engineer:

Name N/A
Title _____
Company _____
Address _____

Phone () _____ Fax () _____
Signature _____
Date _____ E-Mail Address _____

4. Location of proposed source(s), if applicable:

State Pennsylvania County Luzerne
Municipality Salem Township
Latitude N 41° 05' 12.4" Longitude W 76° 07' 53.2"

5. State, county, or other regulatory/permitting contacts:

Agency N/A Department _____
Name _____ Position _____
Permit/Area of Concern: _____
Address _____

Phone _____ E-Mail _____

Agency _____ Department _____
Name _____ Position _____
Permit/Area of Concern: _____
Address _____

Phone _____ E-Mail _____

Agency _____ Department _____
Name _____ Position _____
Permit/Area of Concern: _____
Address _____

Phone _____ E-Mail _____

PPL Susquehanna, LLC
Two North Ninth Street
Allentown, PA 18101-1179
Tel. 610.774.7889
jsfields@pplweb.com



December 20, 2006

Mr. Paul O. Swartz, Executive Director
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391

Attn: Project Review Coordinator

PPL SUSQUEHANNA, LLC
APPLICATION FOR SURFACE WATER WITHDRAWAL
REQUEST TO MODIFY APPLICATION 19950301
EPUL- 0578

Dear Mr. Swartz:

Enclosed for the Susquehanna River Basin Commission's (Commission's) approval please find an application to increase the existing maximum daily surface water withdrawal at the Susquehanna Steam Electric Station (SES) from approximately 58 million gallons per day (MGD) to 66 MGD. This application includes a proposed water use monitoring plan. In addition, PPL Susquehanna, LLC hereby requests modification of Application 19950301 dated March 9, 1995 to eliminate the 30-day average consumptive water use limit of 40 MGD at the Susquehanna SES.

Background

The Susquehanna SES is a two-unit, baseload, boiling-water-reactor electric generating station. Unit 1 and Unit 2 each have a present electrical capacity of 1,190 MWe. Ownership of the Susquehanna SES is shared by PPL Susquehanna, LLC, Berwick, PA (90 percent) and Allegheny Electric Cooperative Inc., Harrisburg, PA (10 percent). PPL Susquehanna is a subsidiary of PPL Generation, LLC, which in turn is an indirect subsidiary of PPL Corporation. PPL Susquehanna (hereinafter "PPL") is the licensed operator of the Susquehanna SES.

The Susquehanna SES is located on the west bank of the Susquehanna River, in Salem Township, Luzerne County, PA. The largest community within 10 miles is the Borough of Berwick, PA located approximately five miles southwest of the station. Susquehanna SES property (owned by PPL and Allegheny Electric) is 1,574 acres in area; 1,173 acres lie to the west of U.S. Route 11 and contain most of the station facilities, and 401 acres lie between U.S. Route 11 and the river and comprise the Susquehanna Riverlands Recreation Area. The Susquehanna Riverlands Recreation Area includes

natural and recreational areas. Also, PPL owns an additional 717 acres of mostly undeveloped property on the east side of the river.

In September 2006, PPL submitted an application to the U.S. Nuclear Regulatory Commission (USNRC) to renew the Susquehanna SES operating licenses for an additional 20 years (Unit 1 to 2042 and Unit 2 to 2044). In October 2006, PPL submitted to the USNRC an application for an Extended Power Uprate (EPU) for both units. The EPU will occur between the second quarter 2008 and the second quarter 2010 and will increase electrical generation up to approximately 1,300 MWe for each unit. Major EPU modifications associated with the station systems will be initiated during the March 2008 or subsequent refueling outages; the river water make-up, circulating water, and blowdown systems will not be modified for the EPU.

The Susquehanna SES withdraws water from the Susquehanna River through a river intake (River Intake Structure) along the west bank of the river adjacent to the station. The River Intake Structure includes four operating pumps, each with an individual design capacity of 13,500 gallons per minute (gpm). The operational combined capacity of the four pumps is approximately 45,000 gpm but can vary depending on river conditions and the conditions of the pumps. Blowdown from the station's cooling water system is discharged back to the river through a diffuser pipe located on the river bottom downstream of the river intake.

Application to Increase Surface Water Withdrawal from the Susquehanna River

The estimated maximum daily rate of river water withdrawal for the existing station is approximately 58 MGD. This withdrawal preceded the effective date (November 1995) of the Commission's surface water withdrawal regulations and, therefore, did not require the approval of the Commission. PPL estimates that the maximum daily post-EPU withdrawal will be no greater than 65.35 MGD. Accordingly, PPL submits the enclosed application for a surface water withdrawal of 66 MGD.

Information on the environmental impact of the EPU may be found in two reports prepared by PPL and submitted to the USNRC, copies of which were given to Commission staff at a meeting on November 13, 2006:

- "Supplemental Environmental Report – Extended Power Uprate" dated March 2006; and
- "Environmental Report – Operating License Renewal Stage – Appendix E" (Section 3.1.2 – Cooling and Auxiliary Water Systems) dated September 2006; see the following website for the entire report:

<http://www.nrc.gov/reactors/operating/licensing/renewal/applications/susquehanna.html>

Water Use Monitoring Plan

ATTACHMENT C to the enclosed application is a proposed Water Use Monitoring Plan. PPL will continue using the cooling tower performance diagram to estimate cooling tower evaporation. Total cooling tower water loss will be estimated by adding an allowance for cooling tower drift loss to the cooling tower evaporation. Total surface water withdrawal will be determined as the sum of (a) the total cooling tower water loss, (b) the cooling tower blowdown, and (c) the makeup flow to the emergency spray pond. Daily volumes of cooling tower water loss and total surface water withdrawal will be reported to the Commission quarterly.

The River Intake Structure includes flow meters to measure withdrawal. However, metering of the withdrawal has been inaccurate due mainly to corrosion and fouling of the intake pipes. The intake pipes are made of carbon steel, and PPL is evaluating replacement of sections of this pipe with stainless steel pipe to minimize flow meter measurement error. Following replacement of sections of pipe from two of the four make-up pumps, it may be possible during one-unit outages to operate the station with those two pumps and to compare the metered withdrawal flow to the calculated sum of cooling tower water loss, cooling tower blowdown, and emergency spray pond makeup. If the pipe replacement project proceeds and withdrawal quantities determined by the two methods are comparable, then PPL will use the metered withdrawal to periodically verify the calculated withdrawal based on the sum of cooling tower water loss, cooling tower blowdown, and emergency spray pond makeup. If the metered withdrawal is significantly different from the calculated withdrawal, PPL will discuss with the Commission the appropriate next steps for measuring withdrawal. PPL will keep the Commission apprised of these activities.

Modification of Consumptive Water Use Application 19950301

On March 9, 1995 (Application No. 19950301), the Commission approved the consumptive water use at the Susquehanna SES up to a 30-day average of 40 MGD, not to exceed a daily usage of 48 MGD. As discussed with Commission staff at the November 13, 2006 meeting, PPL requests a modification to this approval to eliminate the 40 MGD 30-day average limit. This is consistent with other recent consumptive water use application modifications.

Comments

PPL does not expect the maximum daily river water withdrawal to exceed 65.35 MGD. For purposes of this application, PPL is requesting approval of a maximum daily river water withdrawal of 66 MGD. Also, PPL does not expect the maximum daily consumptive water use to exceed the currently approved 48 MGD. In the event of an apparent exceedance, PPL requests an opportunity to evaluate the problem and to discuss it with the SRBC staff prior to the Commission issuing a notice of violation.

Fees

Based on the Commission's Project Fee Schedule effective through December 31, 2006, the fees for the Susquehanna SES permitting activities requested herein are as follows:

• Surface Water Withdrawal Application (66 MGD):	\$186,000.00
• Project Modification (elimination of 30-day average consumptive water use limit of 40 MGD):	<u>\$2,500.00</u>
Total	\$188,500.00

Payment of these fees is being sent to the Commission under separate correspondence.

Public Notice

PPL is proceeding to issue public notice of this application in accordance with the Commission's regulations. Notifications will be made to Luzerne County, Salem Township, a local newspaper, and property owners in Salem Township either contiguous to or nearby the Susquehanna SES.

PPL requests the Commission's prompt review and approval of the enclosed surface water withdrawal application and the request for modification of the approved consumptive water use. Should you or your staff have any questions, please contact me at (610) 774-7889 or by e-mail at jsfields@pplweb.com. Thank you for your consideration.

Sincerely,



Jerome S. Fields, REM
Senior Environmental Scientist – Nuclear

Enclosure: SRBC Surface Water Withdrawal Application

Cc Delivered via electronic mail to:

Ms. P. A. Ballaron	SRBC
Mr. T. W. Beauduy	SRBC
Mr. M. G. Brownell	SRBC
Mr. A. D. DeHoff	SRBC

X:\Special Projects\NEPU Project\NEPU\EPULs

Susquehanna River Basin Commission



a water management agency serving the Susquehanna River Watershed

Surface Water Withdrawal Application for up to 66 MGD at the existing Susquehanna Steam Electric Station (SES) on a maximum day, in conjunction with the Extended Power Uprate (EPU). ATTACHMENT C to this application is a proposed Water Use Monitoring Plan.

1. Applicant Information:

Company Name: PPL Susquehanna, LLC (PPL)

Mailing Address: Two North Ninth Street – GENPL5
Allentown, PA 18101-1179

Contact Person: Jerome S. Fields, REM, Senior Environmental Scientist-Nuclear

Telephone: (610) 774-7889 Fax: (610) 774-7782 E-mail: jsfields@pplweb.com

2. a. Location of sources:

State: Pennsylvania

County: Luzerne

Municipality: Salem Township

- b. You must attach a copy of a USGS 7 1/2 Minute Quadrangle map indicating location of proposed intake(s), all existing project sources, and any water storage facilities.

ATTACHMENT A to this application is an electronically formatted copy of adjoining USGS quadrangles Berwick (PA) and Sybertsville (PA) showing the locations of the facilities, water resources and discharges associated with this application.

- 3. Purpose of withdrawal:** The Susquehanna Steam Electric Station (SES) is an existing, two unit, 2,380-megawatt electrical (MWe), nuclear-fueled electric generating station. An Extended Power Uprate (EPU) is planned for the Susquehanna SES to be implemented in stages from the second quarter 2008 through the second quarter 2010. The EPU is expected to increase the station output to approximately 2,600 MWe.

The Susquehanna River is the primary source of water for the Susquehanna SES and provides essentially all of the cooling water associated with the generation of electricity. The withdrawal of surface water from the Susquehanna River for commercial operation of the Susquehanna SES began in 1983. Water is pumped from the river at an intake

adjacent to the station. The River Intake Structure contains four pumps, each rated at 13,500 gpm. The estimated maximum daily withdrawal by the existing station is approximately 58 MGD. The maximum daily withdrawal from the river is expected to gradually increase to approximately 65 MGD as the EPU is implemented; however, this application is being submitted for 66 MGD. The increased withdrawal will not require modification to the intake, the pumps or the cooling system.

4. Source(s) from which withdrawal is being requested:

Name of Source	Quantity of Withdrawal Requested		Safe Yield or Q7-10 Low Flow ² at Point of Taking (mgd ¹)	Drainage Area (square miles)	Location of Taking Point (latitude/longitude)
	Maximum 30-Day Average (mgd ¹)	Maximum Day (mgd ¹)			
Susquehanna River	NA	66 MGD Note 3	Note 4	Approx. 10,200 sq. miles Note 5	lat: N41°05'12.4" long: W76°07'53.2"
Total	NA	66 MGD Note 3	Note 4		

¹ mgd = million gallons per day

² Use acceptable hydrologic practices in determining 7-day, 10-year low flow.

³ Quantities shown do not include allowance for measurement error.

⁴ A Q7-10 flow of 814 cfs (525 MGD) at the USGS gage at Wilkes-Barre (No. 01536500) has been used by the Commission in determining the need for consumptive use compensation releases from Cowanesque Reservoir. The Wilkes-Barre gage is approximately 20 miles upstream from the SSES river intake. At the Wilkes-Barre gage, the 90-percent exceedance flow is 1,670 cfs, the minimum seven-day low flow is 546 cfs (September 1964), and the minimum daily flow is 532 cfs (September 1964).

⁵ The drainage area at the Wilkes-Barre gage is 9,960 sq. miles. The drainage area at the USGS gage at Danville (No. 01540500), approximately 30 miles downstream, is 11,200 sq. miles.

5. Prior or pending state or federal permits:

Permit Name	Status ¹	Agency	Permit Issue Date	Permit Number
Safe Drinking Water Permit	Prior	PaDEP	2/17/89	2400994
	"	"	12/4/85	2400995
	"	"	12/4/85	2400999
	"	"	12/4/85	2400938
Dams Permit	N/A			
Encroachment or Water Obstruction Permit (intake and discharge diffuser)	Prior	USACOE & PaDEP	9/13/06	CENAB-OP-RPA 06-10107-P12; E40-195
	Prior	"	8/31/88	CENAB-OP-RR 87-1767-4; E40-192
Water Allocation/Appropriation	Prior	SRBC	3/9/95	19950301 Note 3

Permit				
Other (NPDES)	Prior	PaDEP	9/1/05	NPDES PA-0047325
Other (Operating license)	Prior	USNRC	7/17/82 3/23/84	NPF-14 NPF-22
	Pending	USNRC	Note 2	NPF-14 NPF-22

¹ If not applicable list (NA); if pending, (P); if required but not applied for, (R)

² An application was submitted to the US Nuclear Regulatory Commission on Sept. 13, 2006 to renew operating licenses NPF-14 and NPF-22 for an additional 20 years.

³ See also contract between the Commission and Pennsylvania Power & Light Company for development of water supply storage in Cowanesque Reservoir, dated June 30, 1986.

6. Show by calculation how the "Quantity of Withdrawal Requested" was determined. Describe how sufficient this allocation will be in meeting the future needs of this project. Describe alternative sources of supply considered in lieu of requesting a new or increased allocation from the sources listed in Application Section 4. (Attach additional sheets, as necessary.)

See ATTACHMENT B.

7. Existing and projected total water use:

Total Project Water Usage ¹	Existing (mgd) ²	Projected (mgd) ³ for Design Year 2008 and beyond
Average Daily Water Demand	42 MGD Note 5	46 MGD in 2008 49 MGD in 2009 52 MGD in 2010 and beyond Notes 7 and 8
Maximum Daily Water Demand	58 MGD: Note 6	60 MGD in 2008 64 MGD in 2009 65.35 MGD in 2010 and beyond Notes 7 and 9
System Capacity ⁴	The river intake has four pumps, each rated at 13,500 gpm. However, the system capacity with all four pumps operating is approximately 45,000 gpm but can vary depending on river conditions and the conditions of the pumps.	The existing system capacity is adequate and will not need to be increased for the EPU.

- ¹ Project water usage should be on an annual basis, unless the application is for a seasonal operation. For seasonal uses, indicate the duration of the use (the number of months on which the average is based).
- ² For new projects, the existing use should be the proposed use during the first year of operation.
- ³ The projected use should be for 25 years in the future (design year). If the project duration is less than 25 years, indicate the year for which projections were made.
- ⁴ The existing system capacity should not include the proposed sources unless the application is for a new project having no prior withdrawal.
- ⁵ Average usage, years 2002-2005: cooling tower water loss (29.5 MGD, from cooling tower performance diagram) + average cooling tower blowdown (11.8 MGD, metered) + emergency spray pond makeup (0.4 MGD, estimated) = 41.7 MGD.
- ⁶ Maximum daily usage, years 2002-2005: cooling tower water loss (40 MGD, from cooling tower performance diagram) + maximum cooling tower blowdown (17.3 MGD, metered) + emergency spray pond makeup (0.4 MGD, estimated) = 57.7 MGD.
- ⁷ Estimates do not include allowance for measurement error.
- ⁸ Annual average consumptive water use upon completion of the EPU is expected to be 37 MGD.
- ⁹ Maximum daily consumptive water use upon completion of the EPU is expected to be 48 MGD.

8. Existing sources of water:

- a. Wells – Well system began operation in 1974 to provide domestic water supply and (wells TW-1 and TW-2) miscellaneous station purposes excluding condenser cooling. The EPU will not affect the withdrawal or use of groundwater at the Susquehanna SES.

Well Identification	Frequency of Use ¹	Purpose ²	Well Depth (ft)	Cased Depth (ft)	Screened Interval (ft to ft)	Pump Capacity (mgd)	Number of Days Used During Calendar Year	Metered (yes/no)	Average Daily Withdrawal (mgd)	Safe Yield MGD ³
PWS2400994 (TW-1)	E	Domestic + Misc Station	75	Unknown	Unknown	0.07 (50 gpm)	0	Yes	0	0.072
PWS2400994 (TW-2)	R	Domestic + Misc Station	75	Unknown	Unknown	0.22 (150 gpm)	365	Yes	0.094	0.216
PWS2400999	R	Domestic - Energy Information Center	100	Unknown	Unknown	N/A	365	No	Note 4	0.022
PWS2400995	R (Apr-Oct)	Domestic - Riverlands	105	Unknown	Unknown	N/A	200	No	Note 4	0.043
PWS2400938	R	Domestic - West Bldg.	55	Unknown	Unknown	N/A	365	No	Note 4	0.043
Total									<0.114	0.396

¹ Indicate if well is used on Regular (R), Auxiliary (A), or Emergency (E) basis.

² Indicate purpose such as potable supply, non-contact cooling, or water quality remediation.

³ Provide method of computation or submit copies of pumping test data. Data listed in PaDEP Brief Description forms; method(s) not listed.

⁴ The combined withdrawal from these three nearby wells is estimated to be below 0.02 MGD. These wells are not used for station operation but for domestic use at various nearby facilities associated with the station.

b. Other sources of water (stream intakes, interconnections, reservoirs, springs, etc.):

Name	Description	Frequency of Use ¹	Purpose ²	Drainage Area, If Applicable (square miles)	Existing Pump Capacity ³ (mgd)	Number of Days Used During Calendar Year	Metered (yes/no)	Average Daily Withdrawal (mgd)	Safe Yield or Q7-10 Low Flow ⁴ (mgd)
None									
Total									

¹ Indicate if source is used on Regular (R), Auxiliary (A), or Emergency (E) basis.

² Indicate purpose such as potable supply, process water, non-contact cooling, or irrigation.

³ If gravity-fed, give maximum hydraulic capacity and label as such.

⁴ Provide method of computation for 7-day, 10-year low flow for run-of-stream sources.

9. Raw water ponds, lakes, intake dams, and storage dams (existing and/or proposed):

Name	Year Constructed	Year of Last Sedimentation Survey	Storage Capacity (mg)	Surface Area (acres)	Drainage Area (sq mi)	Release Works ¹	
						(yes)	(no)
Lake Took-A-While Note 2	1978-1979	March 1999	Est. 30	Est. 30 Note 3	Estimated 0.53		Note 4

¹ Does the dam have facilities to provide a release of water to the stream when water is not flowing over the spillway or top of dam? If yes, describe length, diameter, depth, valving, etc.

² Lake Took-A-While is located within the Riverlands Recreation Area and is solely a recreation facility.

³ Surface area has varied in different reports from 24 to 35 acres. For the License Renewal environment report 30 acres was used for area.

⁴ The spillway has stop logs that can be removed and replaced manually to control lake level.

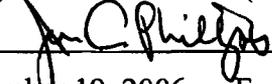
10. Preparer:

Name: Jan C. Phillips, P.E.

Address: 2611 Walnut Street

Allentown, PA 18104-6230

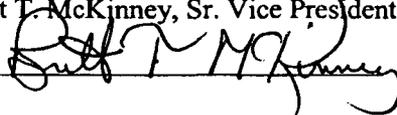
Phone: (610) 821-0160 Fax: (610) 821-0160

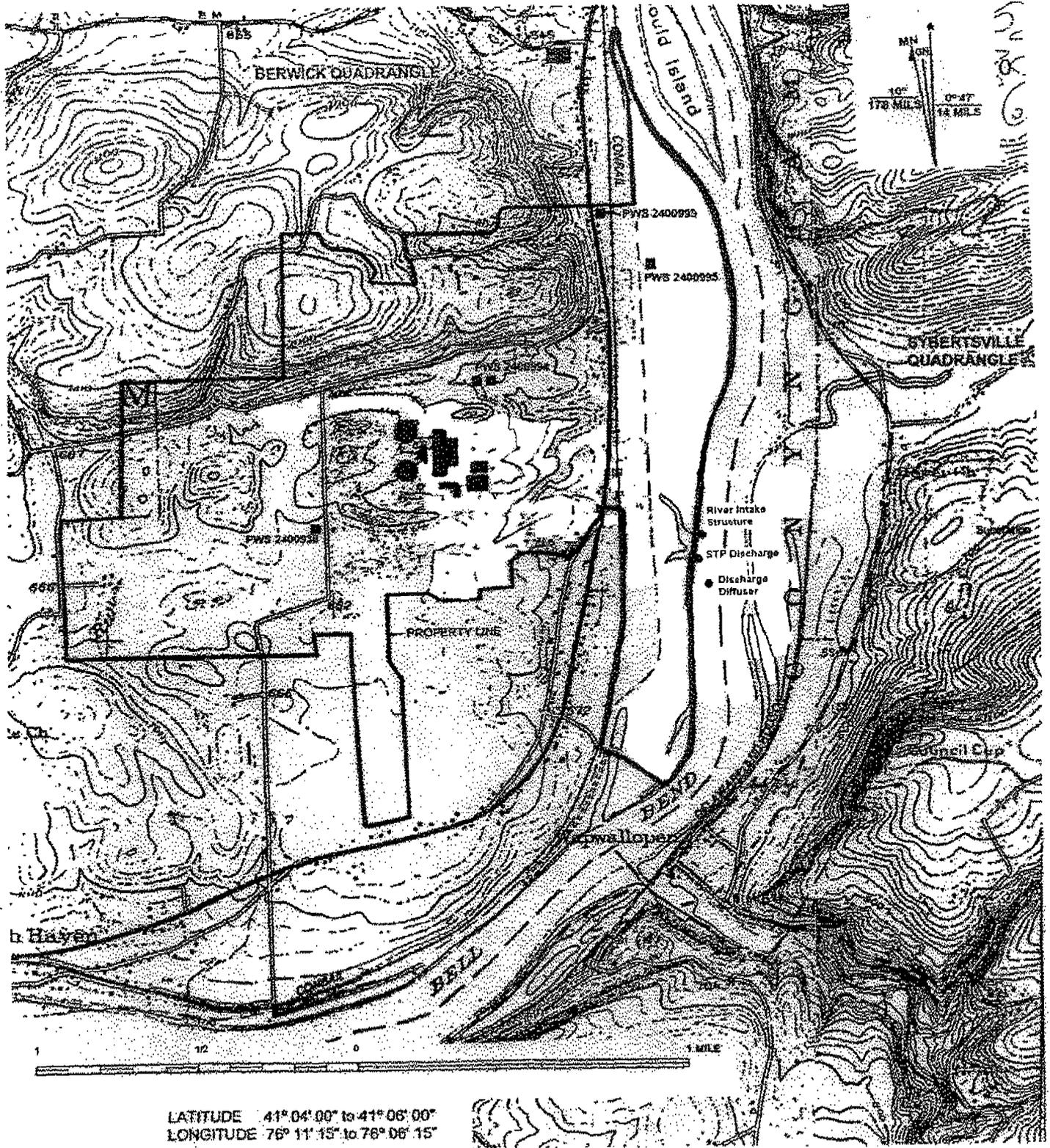
Signature 

Date: December 19, 2006 E-mail Address: jcphllps@enter.net

11. Applicant:

Name: Britt T. McKinney, Sr. Vice President & Chief Nuclear Officer

Signature  Date: December 20, 2006



LATITUDE 41° 04' 00" to 41° 06' 00"
 LONGITUDE 76° 11' 15" to 76° 06' 15"

Attachment A
 Topographic Map
 SSES

ATTACHMENT B

PPL Susquehanna, LLC
Application to SRBC for Surface Water Withdrawal
December 2006

Application Section 6
Determination of Quantity of Withdrawal Requested

The Quantity of Withdrawal Requested is 66 MGD on a maximum day. This amount is the sum, to the next higher MGD, of (a) the estimated maximum daily water loss from the cooling towers (evaporation plus drift allowance) following full implementation of the Extended Power Uprate, (b) the cooling tower blowdown rate associated with the estimated maximum daily cooling tower loss, and (c) the estimated makeup flow to the emergency spray pond, less (d) a small contribution of well water to the cooling water flow. The Quantity of Withdrawal Requested does not include an allowance for flow measurement error.

Cooling tower evaporation is determined from the designer's cooling tower performance diagram (Exhibit A hereto). Cooling tower evaporation as a percentage of the cooling tower water flow is a function of wet-bulb temperature, relative humidity and cooling range. The post-EPU maximum daily consumptive water use has been determined assuming the following conditions:

Wet-bulb temperature (WBT): 77.0°F

Relative humidity (RH): 40 percent

Cooling range: 35.7 F degrees

Cooling tower water flow: 511,000 gpm per tower

The selected environmental conditions (WBT and RH) are considered to be conservative for estimating the maximum daily evaporative loss.

The cooling tower water flow combines circulating water flow (484,000 gpm) and service water flow (27,000 gpm). The cooling range (35.7 F degrees) was calculated based on the combined heat contributions of the circulating and service water flows.

From Exhibit A, for the assumed WBT, RH and cooling range, the rate of evaporation expressed as a percentage of the cooling tower water flow is 3.22 percent. Thus, the evaporative loss per cooling tower expressed in gpm is:

$$\text{Evaporative loss per tower} = 511,000 \text{ gpm} \times 0.0322 = 16,454 \text{ gpm.}$$

The cooling tower manufacturer's estimate of the rate of cooling tower drift loss is 0.02 percent of the cooling tower water flow. Thus, the drift loss per cooling tower expressed in gpm is:

$$\text{Drift loss per tower} = 511,000 \text{ gpm} \times 0.0002 = 102 \text{ gpm.}$$

Thus, the estimated post-EPU maximum daily water loss from the two cooling towers combined, expressed in MGD, is:

$$2 \times (16,454 \text{ gpm} + 102 \text{ gpm}) \times 0.00144 \text{ MGD/gpm} = 47.68 \text{ MGD.}$$

Cooling tower blowdown comprises most of the non-consumptive water use at the Susquehanna SES. The blowdown rate is a function of water chemistry, among other things. The cooling tower blowdown rate is approximated as:

$$\text{Blowdown per tower} = [\text{evaporation} / (\text{concentration factor} - 1)] - \text{drift.}$$

Assuming a concentration factor of 3.7, the blowdown rate per tower expressed in gpm is:

$$[16,454 \text{ gpm} / (3.7 - 1)] - 102 \text{ gpm} = 5,992 \text{ gpm.}$$

Thus, the estimated blowdown rate corresponding to the maximum daily evaporative loss for the two towers combined, expressed in MGD, is:

$$2 \times 5,992 \text{ gpm} \times 0.00144 \text{ MGD/gpm} = 17.26 \text{ MGD.}$$

The makeup flow to the emergency spray pond is estimated to be 300 gpm. Expressed in MGD, the estimated emergency spray pond makeup is:

$$300 \text{ gpm} \times 0.00144 \text{ MGD/gpm} = 0.43 \text{ MGD.}$$

A flow of approximately 0.02 MGD originating from the station wells is added to the cooling water system.

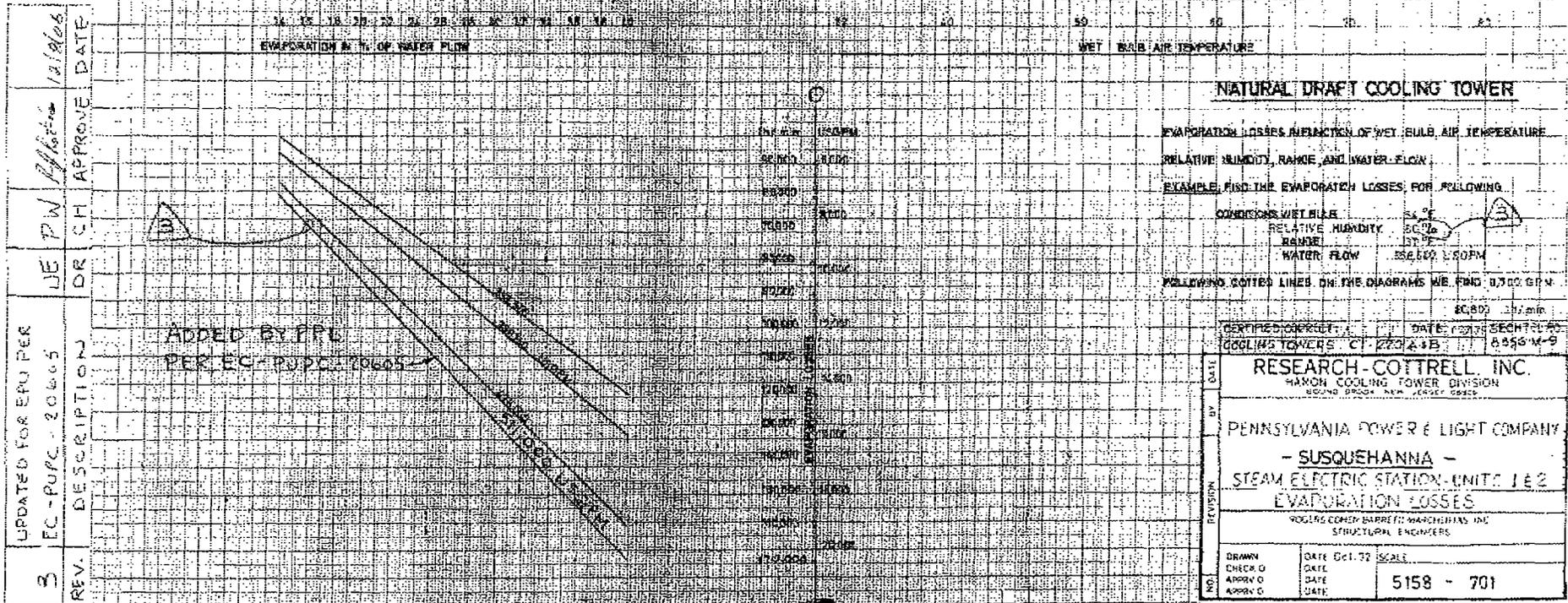
Thus, the total post-EPU maximum daily surface water withdrawal is estimated as:

47.68 MGD	Cooling tower evaporation and drift loss
+ 17.26 MGD	Cooling tower blowdown
+ 0.43 MGD	Emergency spray pond makeup
- 0.02 MGD	Flow from station wells
= 65.35 MGD	Maximum daily surface water withdrawal

or 66 MGD, to the next higher MGD.

The "Quantity of Withdrawal Requested" shown in the table of Item No. 4 of the application is the 66 MGD estimated maximum daily surface water withdrawal rate. This 66 MGD is anticipated to be adequate for the foreseeable life of the Susquehanna SES.

No alternative sources for the amount of additional water needed by the Susquehanna SES following the EPU were considered, nor would any be practicable.



NATURAL DRAFT COOLING TOWER

EVAPORATION LOSSES IN FUNCTION OF WET BULB AIR TEMPERATURE
 RELATIVE HUMIDITY, RANGE AND WATER FLOW
 EXAMPLE: FIND THE EVAPORATION LOSSES FOR FOLLOWING
 CONDENSER WET BULB RANGE 50°F - 57°F
 RELATIVE HUMIDITY 80%
 WATER FLOW 80,000 GPM
 FOLLOWING DOTTED LINES ON THE DIAGRAMS WE FIND 0.700 GPM

CERTIFIED CORPSET DATE 10/21/72
 COOLING TOWERS - CT - 220/245 8455-M-9

RESEARCH-COTTRELL, INC.
 MAJOR COOLING TOWER DIVISION
 BOUND BROOK, NEW JERSEY 07002

PENNSYLVANIA POWER & LIGHT COMPANY
 - SUSQUEHANNA -
 STEAM ELECTRIC STATION - UNITS 1 & 2
 EVAPORATION LOSSES

ROGER CORNELL BARRÉ TO WASHINGTON INC.
 STRUCTURAL ENGINEERS

DRAWN DATE Oct. 72 SCALE
 CHECK G DATE
 APPROV G DATE
 APPROV C DATE

5158 - 701

ADDED BY TPL
 PER EC - PUPC 20605

FF 105590 SH. 0101 RW. 3

8856-M-1-3

M.F.

ATTACHMENT C

PPL Susquehanna, LLC
Application to SRBC for Surface Water Withdrawal
December 2006

Proposed Susquehanna SES Water Use Monitoring Plan

This Plan provides for the metering and measurement of data necessary to determine, for reporting to the Commission, the following water quantities at the Susquehanna SES:

- Daily cooling tower water loss (evaporation and drift loss) for each generating unit; and
- Daily surface water withdrawal from the Susquehanna River.

Exhibit A to this Plan is a station water flow schematic diagram ("SSES Water Flow Diagram – Post-EPU Maximum") showing the facilities and flows indicated herein.

The daily surface water withdrawal is determined from the estimated daily cooling tower water loss, the metered cooling tower blowdown, and the estimated makeup flow to the emergency spray pond.

COOLING TOWER WATER LOSS

Meteorological Data

PPL maintains and operates a meteorological station on the Susquehanna SES site. Wet-bulb temperature (WBT) and Relative humidity (RH) are calculated using temperature and dew point. Daily averages of hourly temperature and dew point readings are used to calculate daily WBT and RH. Temperature is accurate within $\pm 0.9^{\circ}\text{F}$ and dew point to $\pm 2.7^{\circ}\text{F}$.

Cooling Tower Water Flow

The total water flow to each cooling tower is the sum of the respective generating unit's circulating water flow (approximately 95 percent) and the unit's service water flow (approximately 5 percent). The rate of circulating water flow is measured continuously, by ultrasonic metering at Unit 1 and by metering power inflow to the circulating water pumps at Unit 2. The rate of service water flow is assumed to be a constant 27,000 gpm at each unit. Measurement of the circulating water flow is accurate to within ± 2.5 percent.

Cooling Range

The cooling range is the difference between the hot-water temperature and the cold-water temperature in the cooling water flow. The cooling range at Susquehanna SES is determined from the hot-water temperature and the cold-water temperature in the circulating water flow; this assumes that the temperature difference in the circulating water flow is representative of the temperature difference in the service water flow. The hot-water temperature and the cold-water temperature in the circulating water flow are measured continuously. According to manufacturer specifications, the temperature measurements are accurate to within ± 2 percent.

Cooling Tower Evaporation

PPL believes that the most accurate way to estimate cooling tower evaporation at the Susquehanna SES is by use of the cooling tower performance diagram (Exhibit A to ATTACHMENT B of this application). The cooling tower performance diagram was prepared by the cooling tower designer and updated by PPL to indicate the expected post-EPU maximum cooling tower water flow rate (511,000 gpm per generating unit). The diagram permits cooling tower evaporation (gpm) to be estimated from the values of WBT, RH, cooling range and cooling water flow rate. To estimate daily evaporation, the daily average WBT, RH, cooling range and cooling water flow rates are used.

Cooling Tower Drift Loss

The cooling tower manufacturer estimates that drift loss rate is equal to 0.02 percent of the cooling tower water flow rate. The nominal EPU cooling tower water flow rate is 511,000 gpm per unit, so that the estimated drift rate is 102 gpm per tower. For purposes of estimating actual loss, it will be sufficiently accurate to assume a constant drift loss of 100 gpm or 0.15 MGD per tower when the respective generating unit is on line.

Total Cooling Tower Water Loss

The total cooling tower water loss for each generating unit when operating is thus the estimated evaporation loss plus an allowance of 0.15 MGD for drift loss.

COOLING TOWER BLOWDOWN

Cooling tower blowdown represents nearly all of the non-consumptive water use at the Susquehanna SES. Blowdown from each cooling tower is metered continuously. Cooling tower blowdown flow metering is accurate to within ± 2.5 percent. Cooling tower blowdown is discharged to the river downstream from the station.

EMERGENCY SPRAY POND MAKEUP

The emergency spray pond has a surface area of approximately eight (8) acres. The estimated makeup flow to the emergency spray pond is 300 gpm, or approximately 0.43 MGD. Most of this flow is discharged from the pond to the cooling tower blowdown line downstream of the cooling tower blowdown meters. Emergency spray pond levels are monitored, and discharge can be monitored at an overflow weir. A small portion of the emergency spray pond makeup replaces evaporation from the pond.

SURFACE WATER WITHDRAWAL

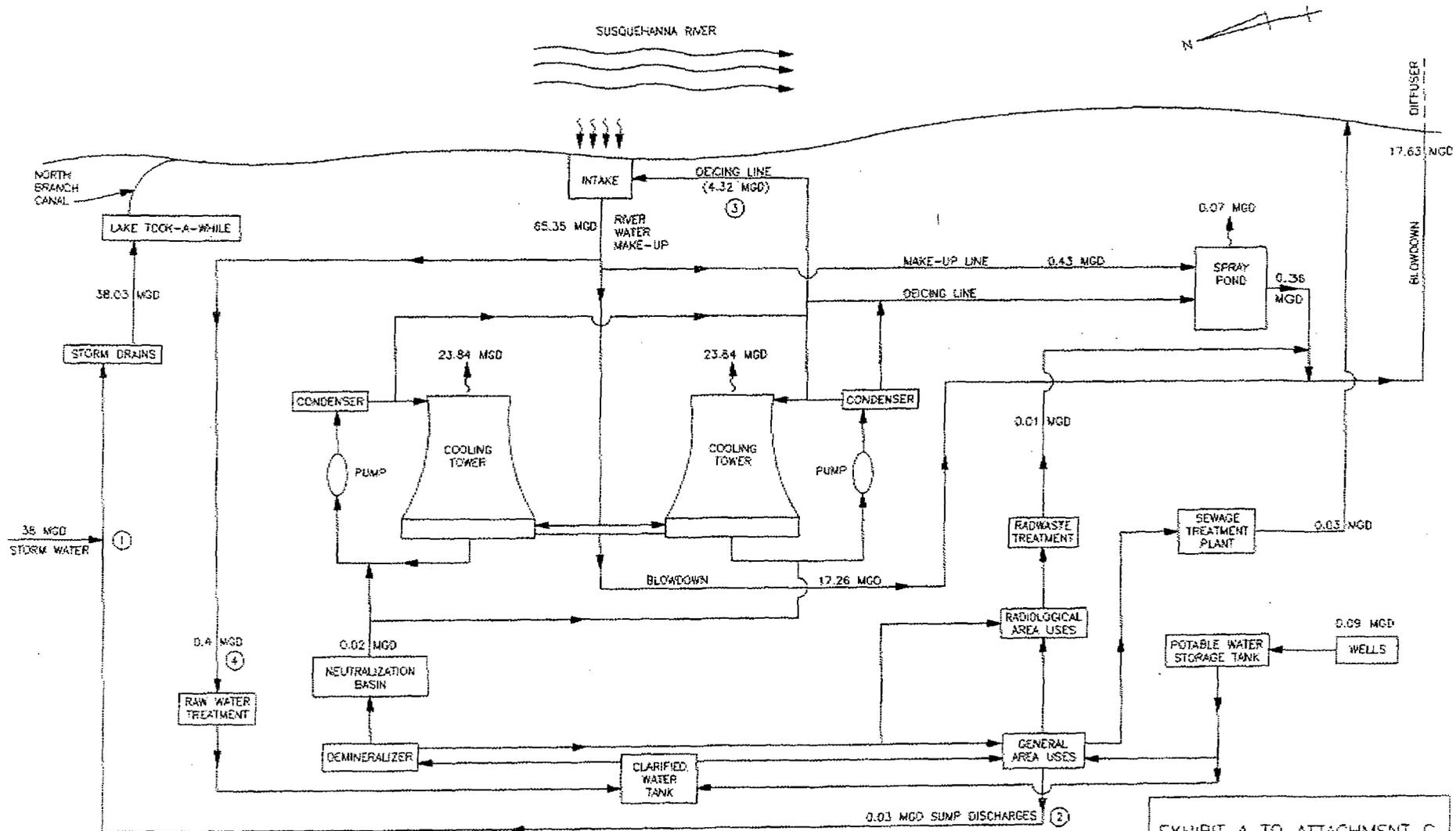
Each generating unit's total water usage is the sum of its cooling tower water loss (consumptive water use) and cooling tower blowdown (non-consumptive water use). The total station surface water withdrawal is estimated as the combined water usage of the two generating units plus an allowance of 0.4 MGD for the emergency spray pond makeup.

DATA

Data monitored under this Plan are continuously entered in the Susquehanna SES Plant Integrated Computer System and readily integrated into daily averages. Final daily quantities of the data to be recorded and reported (below) are organized and/or derived by spreadsheet. The relationships depicted on the cooling tower performance diagram are programmed in spreadsheet format to facilitate estimating cooling tower evaporation from the relevant daily average data.

RECORD-KEEPING AND REPORTING

PPL will keep daily records of (a) the cooling tower water loss for each generating unit, (b) the cooling tower blowdown for each generating unit, and (c) the total station surface water withdrawal, all estimated or measured as described herein, and will report the daily cooling tower water loss and the daily total station surface water withdrawal amounts, expressed in million gallons, to the Commission each quarter.



① STORM EVENT
 ② WHEN OUTSIDE SUMPS ARE DISCHARGED

③ DEICING LINE WATER IS RECIRCULATED BETWEEN THE RIVER INTAKE AND CIRCULATING WATER SYSTEM FROM 1-NOV. THROUGH MID-MARCH. IT IS NOT INCLUDED IN THE STATION'S WATER BALANCE.

④ APPROXIMATELY ONE MONTH PER YEAR AND IS NOT INCLUDED IN STATION'S WATER BALANCE.

EXHIBIT A TO ATTACHMENT C
 SSES WATER FLOW DIAGRAM
 POST-EPU MAXIMUM

2

**REQUEST TO EXTEND DURATION OF SRBC
APPROVAL**



August 8, 2007

Ms. Paula A. Ballaron
Director, Regulatory Program
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391

**PPL SUSQUEHANNA, LLC
REQUEST FOR WAIVER OF TERM OF APPROVAL
FOR APPLICATION 19950301 MODIFICATION
AND ASSOCIATED APPLICATIONS
PLE - 0024400**

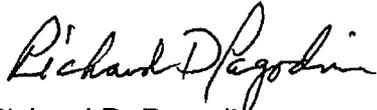
Dear Ms. Ballaron:

PPL Susquehanna, LLC requests a waiver under 18 CFR 806.8, Waiver / modification, for the approval duration of surface water and groundwater withdrawal at the Susquehanna Steam Electric Station SES. A surface water withdrawal application was submitted to the Susquehanna River Basin Commission (Commission) on December 20, 2006 in connection with an Extended Power Uprate request filed with the United States Nuclear Regulatory Commission. The regulations in effect at the time that PPL filed its application with the Commission, limited approvals to 25 years unless an alternate duration period is approved by the Commission (18 CFR 803.30). Under the new regulations approvals are for 15 years unless an alternate duration period is provided for in the Commission's approval (18 CFR 806.31).

In 2006 PPL submitted two applications to the US Nuclear Regulatory Commission. The first was a request to extend the life of the station through March 23, 2044 (an additional period of 20 years), and the second was an Extended Power Uprate request to increase power by about 14%. A waiver of the 25-year (or 15-year) duration limit on Commission approvals to 37 years would coincide with the 20 year license renewal of the Susquehanna SES through March 23, 2044.

PPL requests the Commission's review and approval of this duration of approval extension for the water withdrawal application, as well as for any other application found to be necessary in connection with the Extended Power Uprate. Should you or your staff have any questions, please contact Jerry Fields at (610) 774-7889 or by e-mail at jsfields@pplweb.com. Thank you for your consideration.

Sincerely,



Richard D. Pagodin
General Manager-Nuclear Engineering

JSF/kds

cc delivered via electronic mail to:

Mr. P. A. Swartz	SRBC
Mr. T. W. Beauduy	SRBC
Mr. M. G. Brownell	SRBC
Mr. A. D. Dehoff	SRBC
Mr. E. R. Roof	SRBC

3

**GROUNDWATER APPLICATION REQUIRED BY
SRBC IN ADDITION TO SURFACE WATER**



August 8, 2007

Ms. Paula A. Ballaron
Director, Regulatory Program
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391

PPL SUSQUEHANNA, LLC
APPLICATION FOR GROUNDWATER WITHDRAWAL
AT THE SUSQUEHANNA STEAM ELECTRIC STATION
PLE - 0024401

Dear Ms. Ballaron:

Enclosed for the Susquehanna River Basin Commission's (Commission's) approval please find an application for groundwater withdrawal for the Susquehanna Steam Electric Station (SES). This application is being made in conjunction with PPL Susquehanna LLC's December 2006 application to modify the consumptive use limit for the plant, as well as the surface water application filed with that request.

Please note that the requested groundwater withdrawal limit of .125 mgd is higher than the existing groundwater withdrawal of .094 mgd shown on the diagram submitted with the December 2006 surface water withdrawal application. This is because the plant needs operational flexibility to withdraw more water in case pump seals degrade or other events occur that result in more groundwater needing to be withdrawn than the most current 30-day average amount.

As part of this ground water withdrawal application, PPL requests (per 18 CFR 806.8) a waiver from the application requirement to provide data from a constant rate pump test performed within the last 12 months. Instead, PPL requests to submit the "Aquifer Performance and Evaluation Study for Groundwater Supply", prepared by Dames and Moore, February 11, 1993, which includes data from a constant rate pump test performed by Dames & Moore.

Groundwater wells TW-1 and TW-2 were drilled in 1974 for Bechtel Corporation, the company that constructed the Susquehanna SES. Bechtel was recently contacted to determine if well logs and other pertinent information are still available, and they are not. Since these records are not available, PPL Susquehanna, LLC reviewed several

reports, including those provided to the US Nuclear Regulatory Commission (e.g., Final Safety Analysis Report, Operating License – Environmental Report), and the Pennsylvania Department of Environmental Protection (Brief Description Form), and was able to provide the information and data necessary to complete this application.

PPL Susquehanna, LLC has the following comments on application questions 10 and 11. They are as follows:

Response 10 – The Driller’s Log was provided for observation well no. 109 which is within 30 feet of well TW-1 and within 100 feet of well TW-2.

Response 11 – PPL is providing a well pump test report, “Aquifer Performance and Evaluation Study for Groundwater Supply”, prepared by Dames and Moore, February 11, 1993.

The application fee of \$4,580 has been sent electronically to the Commission.

PPL requests the Commission’s prompt review and approval of this groundwater withdrawal application. Should you or your staff have any questions, please contact Jerry Fields at (610) 774-7889 or by e-mail at jsfields@pplweb.com.

Thank you for your consideration.

Sincerely,



Richard D. Pagodin
General Manager-Nuclear Engineering

JSF/kds

Attachment - Groundwater Application and supporting documents

cc delivered w/o attachment via electronic mail to:

Mr. P. A. Swartz	SRBC
Mr. T. W. Beauduy	SRBC
Mr. M. G. Brownell	SRBC
Mr. A. D. Dehoff	SRBC
Mr. E. R. Roof	SRBC

4 & 5

**ATTACHMENTS TO NO. 3, GROUNDWATER
APPLICATION**

Susquehanna River Basin Commission

a water management agency serving the Susquehanna River Watershed



Ground-Water Withdrawal Instructions and Application

Who Must Submit an Application:

An application must be submitted by anyone proposing :

- A new withdrawal from a single well or well field in excess of 100,000 gallons per day (gpd).
- A new well(s) or an increased withdrawal for a project that has an SRBC approved ground-water withdrawal, regardless of the quantity of the proposed increase or the withdrawal from the new well(s).
- An increase in any ground-water withdrawal initiated prior to July 13, 1978, by 100,000 gpd or more.
- An increase in any ground-water withdrawal initiated on or after July 13, 1978, to 100,000 gpd or more.

NOTE: All quantities are 30-day averages.

Check List of Items to Accompany Application:

- 1. All appropriate attachments:
 - a. Public water suppliers must complete the attached Public Water Supply Information, SRBC #24P, and
 - b. All other users except agriculture must complete the attached Consumptive Use Application, SRBC #24C.
- 2. Copy of USGS 7 1/2' quadrangle map showing project location. Proposed and nearby wells must be identified on the map.
- 3. Well Record - Proposed Well(s). (See application section 8.)
- 4. Well Record - Existing Nearby Well(s). (See application section 9.)
- 5. Copy of pumping test data sheets, etc. (Dames and Moore report provided)
NOTE: Review and approval by the Susquehanna River Basin Commission of the test procedures to be used by the applicant are necessary before the test is started.
- 6. Copy of chemical analysis. Public water suppliers should submit a copy of the analysis required by the respective state for new sources. Other users must provide the analyses listed on Chemical Analysis of Ground Water, SRBC #24A.
- 7. The application must be signed by the preparer and the applicant.
- 8. Submit the appropriate application fee based on Fee Resolution 98-19 (available on our web site). If you also are submitting a consumptive use application, submit the higher fee. (Sent electronically)

Notification Material:

Please submit the appropriate notification material, as required by Section 803.25 of our *Regulations and Procedures for Review of Projects* (all of which are available on our web site), within 10 days of application submittal.

Where to File Application:

Project Review Coordinator
Susquehanna River Basin Commission
1721 N. Front Street
Harrisburg, PA 17102-2391

If you need assistance, contact the Susquehanna River Basin Commission, Water Management Division at (717) 238-0426, fax (717) 238-2436, or via e-mail addressed to srbc@srbc.net.



Susquehanna River Basin Commission

a water management agency serving the Susquehanna River Watershed

Ground-Water Withdrawal Application

1. Applicant Information:

Company Name PPL Susquehanna, LLC
Mailing Address Susquehanna Steam Electric Station
769 Salem Boulevard
City Berwick State PA Zip 18603
Contact Person Jerome S. Fields Title Sr. Environmental Scientist - Nuclear
Telephone (610)774-7889 Fax (610)774-7782 E-mail jsfields@pplweb.com

2. a. Location of proposed well(s):

State Pennsylvania County Luzerne
Municipality Salem Township

b. You must attach a copy of a USGS 7 1/2 Minute Quadrangle map indicating location of proposed well(s), all existing project wells, and any nearby wells.

3. Purpose of proposed withdrawal(s): Supplying domestic water, demineralized water, maintaining pump seals, and other miscellaneous uses

4. Requested withdrawal from proposed well(s) (based on a 30-day average):

Well Number TW-1 - 0.072 mgd.
Well Number TW-2 - 0.125 mgd.
Well Number _____ - _____ mgd.
Well Number _____ - _____ mgd.

5. Total combined withdrawal from proposed well(s) 0.125 MGD (based on a 30-day average).

Well number TW-1 is only used for back-up when TW-2 is out of service. They do not operate at the same time. These two wells are part of the same Non-transient Non-community water system – PWS ID #2400994.

6. Existing and projected total water use:

Total Project Water Usage ¹	Existing (mgd) ²	Projected (mgd) ³ for Design Year 2044
Average Daily Water Demand	0.094	0.125
Maximum Daily Water Demand (Max day in 2007 through June; March 17)	0.194	0.194
System Capacity ⁴	0.216	0.216

Explanation

¹ Project water usage should be on an annual basis, unless the application is for a seasonal operation. For seasonal uses, indicate the duration of the use (the number of months on which the average is based).

² For new projects, the existing use should be the proposed use during the first year of operation.

³ The projected use should be for 25 years in the future (design year). If the project duration is less than 25 years, indicate the year for which projections were made.

⁴ The existing system capacity should not include the proposed sources unless the application is for a new project having no prior withdrawal.

7. Existing sources of water:

a. Wells

NOTE: TW-1 is used for backup only. Since the wells are on the same system, there is a common meter.

Well Number	Well Depth (ft)	Cased Depth (ft)	Screened Interval (ft to ft)	Existing Pump Capacity (mgd)	Average Daily Withdrawal (mgd)	Metered (yes/no)
TW-1	75	Unknown	Unknown	0.072	0.072	Yes
TW-2	75	Unknown	Unknown	0.216	0.094	Yes

b. Other sources of water (stream intakes, interconnections, reservoirs, springs, etc.):

Name	Description	Average Daily Withdrawal (mgd)	Number Days Used During Calendar Year	Safe Yield (mgd)	Metered (yes/no)
Susquehanna River	Surface water	52 (1)	365	525 (2)	No (3)

NOTES: (1) Beginning in 2010 at Extended Power Uprate conditions. See No. 7 surface water withdrawal application.
 (2) See No. 4 note 4 of the Surface Water Withdrawal Application (submitted 12/20/2006): Q7-10 flow of 814 cfs (525 MGD) at Wilkes- Barre.
 (3) Withdrawal is calculated; Consumptive Use + Blowdown = Withdrawal

8. Well record (proposed well(s)): N/A – information is not available

Well No. TW-1 Geologic Formation Mahantango
 Date Drilled Sept. 1974 (first used) Well Driller Bechtel Corp. contractor
 Depth Drilled 75 feet ft Diameter 8 inches in
 Casing: Min. Diameter N/A in Max. Length N/A ft
 Well Screen: Type N/A Diameter N/A in
 Top of Screen N/A ft Bottom of Screen N/A ft
 Well Yield 0.072 MGD gpm Specific Capacity 0.67 gpm/ft
 Permanent Pump: Type Submersible
 Capacity 50 gpm Intake Setting N/A ft
 Air Line Depth No airline ft Type of Metering Totalizer

Well No. TW-2 Geologic Formation Mahantango
 Date Drilled Sept. 1974 (first used) Well Driller Bechtel Corp. contractor
 Depth Drilled 75 feet ft. Diameter 8 inches in
 Casing: Min. Diameter N/A in Max. Length N/A ft
 Well Screen: Type N/A Diameter N/A in
 Top of Screen N/A ft Bottom of Screen N/A ft
 Well Yield 0.216 MGD gpm Specific Capacity 2.04 gpm/ft
 Permanent Pump: Type Submersible
 Capacity 150 gpm Intake Setting N/A ft
 Air Line Depth No air line ft Type of Metering Totalizer

Contents of Submitted SRBC Groundwater Withdrawal Application Package:

Page 1; Check List for SRBC Groundwater Withdrawal Application

Pages 2 - 7; SRBC Groundwater Withdrawal Application, signed by preparer and applicant.

ATTACHMENTS

- Copy of Berwick USGS 7 ½' quadrangle map (required per **section 2.b** of application)
- Log of Boring; Observation Well 109 (required per **section 10** of application)
- Unified Soil Classification System Figure 2.54T (complimentary to Log of Boring, Observation Well 109)
- Pump test data (required per **section 11** of application)¹; Aquifer Performance and Evaluation Study, Susquehanna Steam Electric Station, Pennsylvania Power and Light Company, Berwick, Pennsylvania; February 11, 1993, Job No. 04894-098-176; Dames & Moore. This study includes the following figures:
 - Site Plan.
 - Bechtel Drawing FCI-C14; isometric of Water Well Supply Line.
 - Map of Susquehanna SES Showing Top-Of-Bedrock Contours, Figure 2.4-15 - Wells TW-1, TW-2 and 109 are located southwest of cemetery.
- Wilkes-Barre, PA flow data from Nov. 28 through Dec. 27, 1992.
Source: USGS (<http://waterdata.usgs.gov/>)

NOTE 1:

- Information requested in **Items a – e** included in the provided Dames & Moore Aquifer Performance Study.
- Information requested in **Item f** (Weather and flow data from pumping test period; November 30 through December 17, 1992):
 - Precipitation
 - Dec. 4 – 0.03 inches
 - Dec. 5 – 0.02 inches
 - Dec 10 – 0.05 inches
 - Dec. 11 – 0.09 inches
 - Dec. 12 - 0.01 inches
 - Dec. 17 – 0.33 inches
 - Measurements or observations of nearby stream flows – See attached Wilkes-Barre, PA flow data from Nov. 28 through Dec. 27, 1992.
 - The temperatures during the pumping tests ranged from 14.4 °F to 43.2 °F.

NOTE 2:

Application Fee of \$4,580 for two wells (TW-1 and TW-2) was submitted electronically to SRBC on 8/8/07; remitted amount based on Resolution no. 2006-08

9. Existing nearby wells:

Attach map identifying all nearby wells owned by others that could be affected by pumpage of the proposed well(s) and complete items below for each well.

Existing nearby wells: There are no nearby wells owned by others in the vicinity of wells TW-1 and TW-2 that could be affected by pumpage by these wells.

Owner _____ Phone _____
Address _____
Well No. _____ Well Use _____
Date Drilled _____ Well Driller _____
Well Depth _____ ft Estimated Yield _____ gpm
Depth to Water-Bearing Zone(s) _____ ft Screened Interval _____ ft to _____ ft
Pump Type _____ Pump Intake Setting _____ ft
Distance from Proposed Well(s) _____ ft

Owner _____ Phone _____
Address _____
Well No. _____ Well Use _____
Date Drilled _____ Well Driller _____
Well Depth _____ ft Estimated Yield _____ gpm
Depth to Water-Bearing Zone(s) _____ ft Screened Interval _____ ft to _____ ft
Pump Type _____ Pump Intake Setting _____ ft
Distance from Proposed Well(s) _____ ft

Attach copies of this page as needed.

10. Driller's log: *Unable to locate well logs for wells TW-1 and TW-2; however, PPL Susquehanna was able to find observation well 109 log for nearby well (Attached).*

Attach separate sheet describing the nature and depth interval of subsurface materials and water-bearing zones penetrated during drilling of each proposed well.

11. Pumping test: *We are providing a pumping test report prepared by Dames & Moore – "Aquifer Performance and Evaluation Study, ..." February 11, 1993, Dames & Moore*

NOTE: Review and approval by the Susquehanna River Basin Commission of the test procedures to be used by the applicant are necessary before the test is started.

Attach copies of basic data sheets and any resultant water level charts, tables, graphs, etc., for the pumped well, monitoring wells, and nearby perennial stream sites. The pumping test shall be of not less than 48 hours pumping duration and at a constant withdrawal rate not less than the proposed rate. A step-drawdown pumping test may

precede the 48-hour test, however, water levels should be allowed to essentially recover prior to the constant rate test. The following information from the test is generally required:

- a. Date and time of all static, pumping, and recovery water level measurements.
- b. Record of pumping rate measured frequently throughout the test.
- c. Sufficient static water level measurements in all wells to determine any trends in water level changes prior to the beginning of pumping. All water levels are to be measured to an accuracy of one-tenth of a foot.
- d. Pumping and recovery measurements from the pumped well.
- e. Monitoring data from a sufficient number of wells to determine all possible interference.
- f. Records of precipitation, measurements or observations of nearby streamflows, and weather conditions throughout the test.

12. Preparer:

Name Jerome S. Fields
Title Sr. Environmental Scientist - Nuclear
Company PPL Susquehanna, LLC
Address Two N. 9th Street
GENPL5
Allentown, PA 18101-1179
Phone (610) 774-7889 Fax (610) 774-7782
Signature *Jerome S. Fields*
Date 8/3/07 E-mail Address jsfields@pplweb.com

13. Applicant:

Name (print or type) Richard D. Pagodin Title General Manager-Nuclear Engineering
Signature *Richard D Pagodin* Date 8-8-07

SOIL CLASSIFICATION CHART

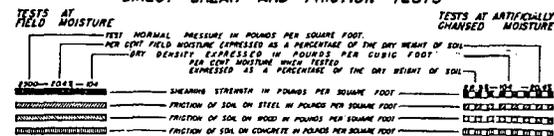
MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	[Pattern]	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	[Pattern]	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN SAND (LITTLE OR NO FINES)	[Pattern]	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	[Pattern]	SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
	MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)	[Pattern]	SM	SILTY SANDS, SAND-SILT MIXTURES
			SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	[Pattern]	SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	[Pattern]	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
		LIQUID LIMIT GREATER THAN 50	[Pattern]	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
	MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	[Pattern]	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
			LIQUID LIMIT GREATER THAN 50	[Pattern]	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
	HIGHLY ORGANIC SOILS	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	[Pattern]	MH	INORGANIC SILTS, MICACEOUS OR DISTORTIONOUS FINE SAND OR SILTY SOILS
			LIQUID LIMIT GREATER THAN 50	[Pattern]	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS					

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDRLINE SOIL CLASSIFICATIONS.

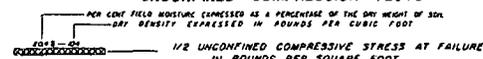
<p>GRADATION *</p> <p>% FINER BY WEIGHT</p> <p>TRACE..... 0% TO 10%</p> <p>LITTLE..... 10% TO 20%</p> <p>SOME..... 20% TO 35%</p> <p>AND..... 35% TO 50%</p> <p>* VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE. WHEN NO TESTING HAS PERFORMED, VALUES ARE ESTIMATED.</p>	<p>COMPACTNESS *</p> <p>SAND AND/OR GRAVEL</p> <p>RELATIVE DENSITY</p> <p>LOOSE..... 0% TO 40%</p> <p>MEDIUM DENSE..... 40% TO 70%</p> <p>DENSE..... 70% TO 90%</p> <p>VERY DENSE..... 90% TO 100%</p>	<p>CONSISTENCY *</p> <p>CLAY AND/OR SILT</p> <p>RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT</p> <p>VERY SOFT..... LESS THAN 250</p> <p>SOFT..... 250 TO 500</p> <p>MED. UN..... 500 TO 1000</p> <p>STIFF..... 1000 TO 2000</p> <p>VERY STIFF..... 2000 TO 4000</p> <p>HARD..... GREATER THAN 4000</p>
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KEY TO TEST DATA

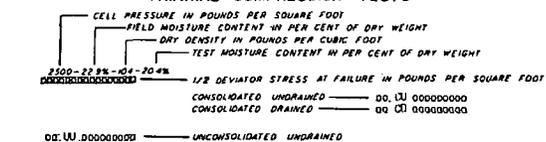
DIRECT SHEAR AND FRICTION TESTS



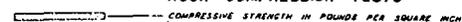
UNCONFINED COMPRESSION TESTS



TRIAxIAL COMPRESSION TESTS

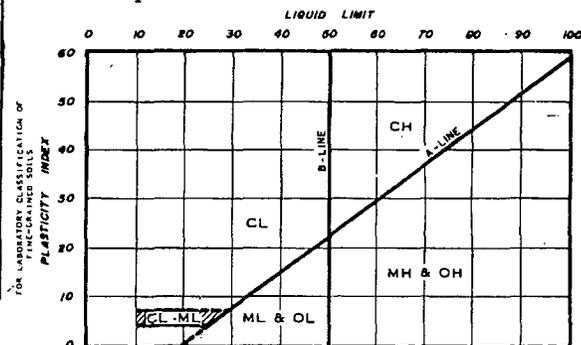


ROCK COMPRESSION TESTS



KEY TO SAMPLES

- INDICATES DEPTH OF UNDISTURBED SAMPLE
- INDICATES DEPTH OF DISTURBED SAMPLE
- INDICATES DEPTH OF SAMPLING ATTEMPT WITH NO RECOVERY
- ◇ INDICATES DEPTH OF SPLIT-SPOON SAMPLE
- ┌ INDICATES DEPTH AND LENGTH OF CORING RUN

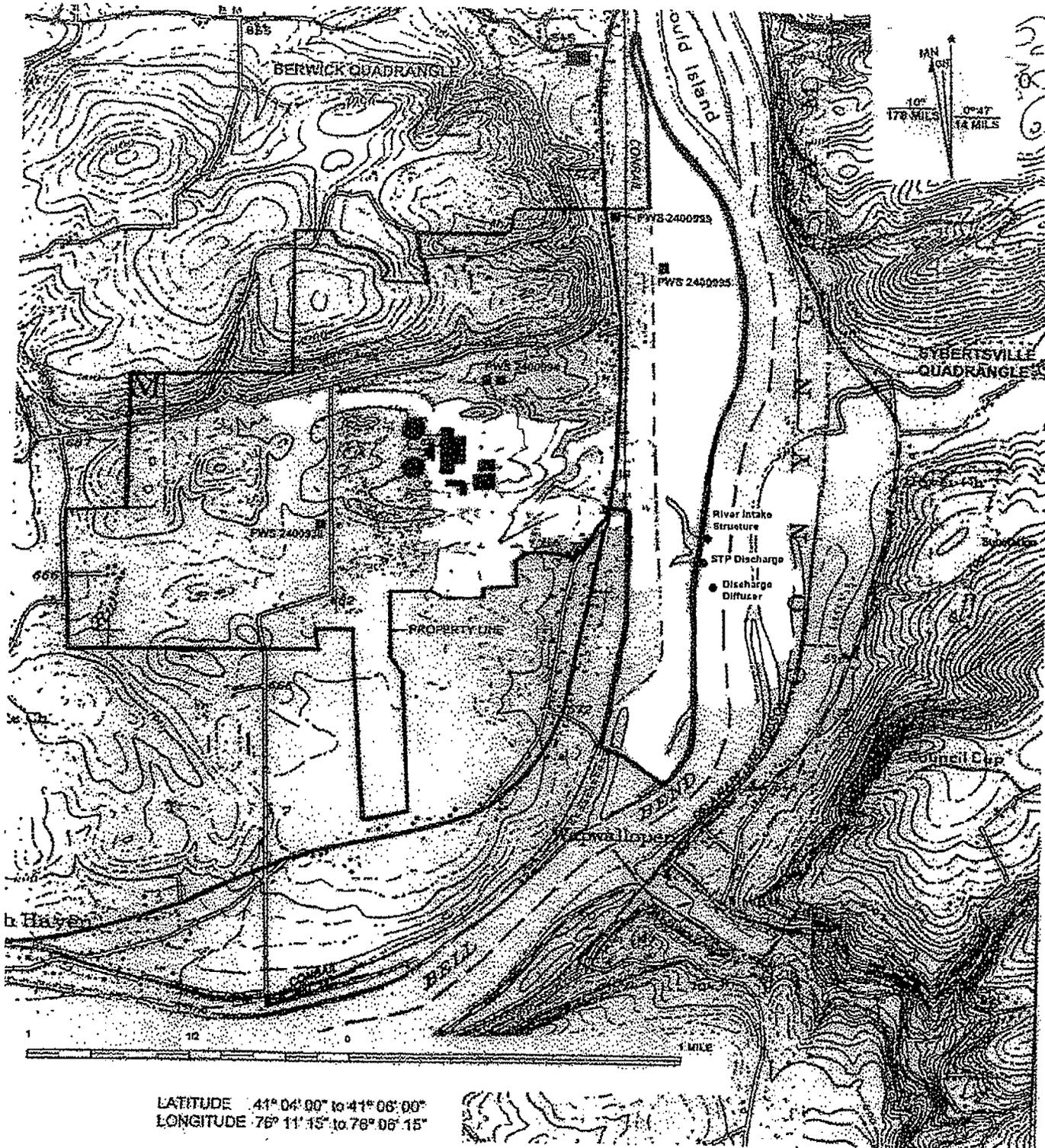


PENNSYLVANIA POWER & LIGHT COMPANY
SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
PRELIMINARY SAFETY ANALYSIS REPORT

UNIFIED
SOIL CLASSIFICATION SYSTEM

DAMES & MOORE

FIGURE 2.5.4T



LATITUDE 41° 04' 00" to 41° 06' 00"
 LONGITUDE 76° 11' 15" to 76° 06' 15"

Attachment A
 Topographic Map
 SSES

6

**SRBC APPROVAL FOR SURFACE WATER AND
GROUNDWATER WITHDRAWAL AND
CONSUMPTIVE USE**

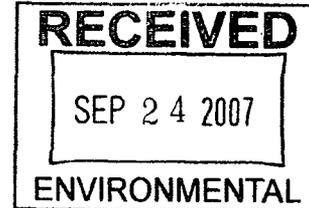
Susquehanna River Basin Commission

a water management agency serving the Susquehanna River Watershed



September 19, 2007

Mr. Jerome S. Fields
Senior Environmental Scientist
PPL Susquehanna, LLC
Two North Ninth Street (GENPL5)
Allentown, PA 18101-1179



Re: PPL Susquehanna, LLC-Susquehanna Steam Electric Station,
Commission Docket No. 19950301-1

Dear Mr. Fields:

We are pleased to inform you that on September 12, 2007, the Susquehanna River Basin Commission (Commission) acted on and approved the surface water and groundwater withdrawals from the Susquehanna River and Wells TW-1 and TW-2, and changed the consumptive water use approval from a 30-day average to a peak day for your project, as indicated on the enclosed amendment, Docket No. 19950301-1. Pursuant to Commission Regulation 18 CFR §808.2 relating to administrative appeals, any appeal to this docket must be made in writing to the Executive Director within 30 days of the date of the Commission's action.

This amendment is for a surface water withdrawal of up to 66,000 million gallons per day (mgd) from the Susquehanna River; a groundwater withdrawal of 0.072 mgd (30-day average) from Well TW-1 and 0.125 mgd (30-day average) from Well TW-2, and a total groundwater withdrawal system limit of 0.125 mgd (30-day average); and a consumptive water use of up to 48,000 mgd for power plant operations.

This amendment also requires continued compliance with the Commission's monitoring and reporting requirements, 18 CFR §806.30. Under the recently adopted regulations, all approved projects are required to monitor daily withdrawal quantities and to report quarterly instead of annually. Quarterly reports and the appropriate payment should be submitted within 30 days after the close of the preceding quarter. The first report is due by January 30, 2008, and should include monitoring data for the first, second, third, and fourth quarters of 2007, and the appropriate payment for the fourth quarter only. **Also, please note that reporting procedures have changed. All monitoring data should be submitted "on-line" using the Internet. The person responsible for maintaining and submitting the monitoring data should contact Todd Hitz at (717) 215-7282 within 10 days to review the requirements of this amendment and discuss proper reporting procedures.**

Please be advised that, under Commission Regulation §808.11, the approval granted by the Commission is contingent upon compliance with all provisions of the Susquehanna River Basin Compact (Compact), as well as the Commission's rules, regulations, order, approvals, docket conditions, and any other requirements of the Commission. It is your obligation to fulfill the docket conditions within the specified time limits and provide written notification to the Commission, as appropriate, and comply with all conditions set forth therein. Failure to meet any term or condition within the specified time may subject you to enforcement action and imposition of civil penalties pursuant to Commission Regulation 18 CFR Section 808, Subpart B, §808.15(f), and Section 15.17 of the Compact. Penalties range from \$50 to \$1,000 a day, per condition (which includes exceeding approved quantities), with every day being a separate offense.

If you have any questions regarding the above, please contact me at (717) 238-0425, extension 222. In addition, if the amount of your water use or your water source should change in the future, you are required to reapply to the Commission for approval. Please notify the Commission prior to any modifications in your project to remain in compliance.

Sincerely yours,



Paula B. Ballaron, P.G.
Director, Regulatory Program

Enclosure

cc: G. Petrewski, PPL Generation, LLC
A. Khanwalkar, PPL
R. Franovich, U.S. Nuclear Regulatory Commission
E. Epstein



SUSQUEHANNA RIVER BASIN COMMISSION

1721 North Front Street • Harrisburg, Pennsylvania 17102-2391

Phone (717) 238-0423 • Fax (717) 238-2436

Web <http://www.srbc.net>

Docket No. 19950301-1

Approval Date: March 9, 1995

Modification Date: September 12, 2007

PPL SUSQUEHANNA, LLC— SUSQUEHANNA STEAM ELECTRIC STATION

Surface Water Withdrawal of up to 66.000 mgd (Peak Day) from the Susquehanna River,
Groundwater Withdrawal of 0.125 mgd (30-Day Average) from Wells TW-1 and TW-2,
and Consumptive Water Use of up to 48.000 mgd (Peak Day),
for Power Plant Operation,
Salem Township, Luzerne County, Pennsylvania

Review Authority

This project is subject to review pursuant to Article 3, Section 3.10, of the Susquehanna River Basin Compact (Compact), P.L. 91-575, 84 Stat. 1509 et seq., and Susquehanna River Basin Commission (Commission) Regulation §806.4, relating to projects requiring review and approval. The Commission received the applications for consumptive use of water and surface water withdrawal on December 20, 2006, and for groundwater withdrawal on August 9, 2007.

Description

Purpose. The purpose of the applications is to request an increase in consumptive water use and approval of surface water and groundwater withdrawals for processes related to an increase in power production and continued operations at the Susquehanna Steam Electric Station (SSES).

Location. The project is located in the Middle Susquehanna Subbasin, HUC 02050107, Salem Township, Luzerne County, Pennsylvania.

Background. The SSES is currently approved by the Commission to consumptively use water (Commission Docket No. 19950301, dated March 9, 1995, [Docket]). That approval incorporates the terms of all related Commission resolutions adopted prior to the approval of the Docket, including Commission Resolution Nos. 82-5, 83-1, 89-12, 90-02, and 91-2. Resolution No. 82-5, effective February 11, 1982, deemed that release of water stored in the Cowanesque Reservoir presents an acceptable manner of mitigation for consumptive use. Resolution No. 83-1, effective January 13, 1983, temporarily certified the project sponsor, PPL Susquehanna, LLC (PPL), to be in compliance with the Commission's consumptive use regulation at the SSES. PPL entered into an agreement, effective June 30, 1986, to participate in

the development of water storage at the Cowanesque Reservoir for the purpose of securing consumptive use mitigation. The operations and release plan from Cowanesque Reservoir was adopted by Resolution No. 89-12, effective September 21, 1989. Under the terms of Resolution No. 90-02, adopted by the Commission on January 18, 1990, the consumptive water use mitigation provided by the SSES through releases at the Cowanesque Reservoir was determined to satisfy the Commission's mitigation requirement for the existing operation. Resolution No. 91-2, effective May 9, 1991, imposed recordkeeping and reporting requirements on the SSES.

The project sponsor participated in the reallocation of storage in the Cowanesque Lake project and, through an agreement with the Commission, sponsored a total of 16,061 acre-feet of storage at the Cowanesque Lake project. Of this amount, 3,000 acre-feet of storage was subsequently dedicated to the Montour Steam Electric Generating Station, and the remaining 13,061 acre-feet is available to the SSES to mitigate consumptive losses during low flow periods.

PPL applied to and received approval from the U.S. Nuclear Regulatory Commission (NRC) to uprate Unit 2 in 1994 ("stretch" uprate) and to similarly uprate Unit 1 in 1995. The Docket, dated March 9, 1995, approved the corresponding increase in consumptive water use (approximately 3.1 percent) associated with these power uprates and determined that water storage in Cowanesque Reservoir allocated to the SSES (13,061 acre-feet) was sufficient to mitigate for consumptive losses of 40,000 million gallons per day (mgd) (on a 30-day average) during low flow periods. At that time, the Commission determined that the increase accounted for all of the water storage at Cowanesque Reservoir that was available for mitigation at the SSES.

PPL applied to and received approval from the NRC to uprate Units 1 and 2 again in 2001 ("measurement uncertainty recapture" uprate). No similar application was made to the Commission at that time.

In October 2006, PPL submitted an application to the NRC for approval of an Extended Power Uprate (EPU) that will increase the thermal power level of the units. Presently, Unit 1 and Unit 2 are each approved for 3,489 megawatts (MW) thermal (t) power. The EPU, if approved, will increase the limit for each unit to 3,952 MWt (approximately a 13.3 percent increase). The increased thermal power will result in an increase in peak and average consumptive water use and surface water withdrawal, and prompted the pending applications.

Project Features. PPL has requested continued approval for consumptive water use of up to 48,000 mgd on a peak day, and elimination of the 30-day average consumptive use limitation of up to 40,000 mgd. The project sponsor also has requested approval for a surface water withdrawal of up to 66,000 mgd (peak day) from the Susquehanna River, and approval for a total groundwater withdrawal of 0.125 mgd (30-day average) from Wells TW-1 and TW-2. The withdrawals and consumptive water will support the operation of the facility as it will be modified by the EPU.

Specific locational information concerning discrete water-related project features has been withheld for security reasons.

The project consists of two nuclear-powered base-load steam electric generating units, known as Unit 1 and Unit 2. Units 1 and 2 began commercial operation in 1983 and 1985, respectively, and each unit has a closed-cycle cooling system with an evaporative cooling tower. The SSES has a spray pond, common to both units, which provides supplemental cooling. Consumptive water losses at the SSES result from evaporation and drift losses at the cooling towers and similar losses from the spray pond.

Surface water withdrawals at the SSES result from pumping Susquehanna River water from a cooling water intake structure to supply makeup water to the cooling tower basins and the spray pond, and to supply raw water to a water treatment system. The withdrawals are used to make up for consumptive water losses and for water discharged back to the Susquehanna River in conjunction with non-consumptive usage as necessary to maintain adequate water levels and quantity for facility operation.

The river intake structure includes flow meters to measure the withdrawal. However, in 2001, the SSES reported that the measurement was inaccurate due mainly to corrosion and fouling of the carbon steel intake pipes which interfered with the operation of the sonic flow meters. Commission staff subsequently reviewed and approved a procedure for use of cooling tower performance diagrams as an alternative to direct measurement to account for consumptive water use.

Groundwater withdrawals to supply sanitary water for the facility, to produce demineralized water, to maintain pump seals, and for miscellaneous process uses at the SSES result from pumping water from two on-site wells, Wells TW-1 and TW-2 (the primary well). The two well system was designed to provide for a mechanical backup should one well become unavailable and, as such, the wells cannot be operated simultaneously and are not separately metered. The 8-inch-diameter wells were drilled in 1974 to depths of approximately 75 feet. The site is underlain by the Devonian Mahantango Formation, a siltstone and shale. Glacial deposits, which consist of stratified sand and gravel overly the bedrock, occur in thicknesses of 0 to 20 feet, except when infilling buried bedrock valleys when the thickness can exceed 80 feet. The wells likely are completed in the glacial deposits, but the SSES was unable to provide well logs.

In September 2006, PPL requested a license renewal from NRC extending the term of the operating licenses by 20 years, from July 2022 to July 2042 (Unit 1) and from March 2024 to March 2044 (Unit 2). The project sponsor has requested that the Commission extend the term of its approval to 37 years to coincide with the requested 20-year license renewal of the SSES through March 23, 2044.

Aquifer Test. A 7-day, constant-rate aquifer test of Well TW-2 was conducted on December 7-14, 1992. In addition to the production well and Well TW-1, three piezometers and one observation well were monitored. A separate stepped-rate pumping test of Well TW-2 preceded the constant-rate aquifer test. During the stepped-rate pumping test, Well TW-2 was pumped at rates varying from approximately 30 gallons per minute (gpm) to 90 gpm.

The testing was not pre-approved by Commission staff. With Well TW-2 pumping at 92 gpm, 37.16 feet of drawdown occurred at the production well after 7 days of pumping. Drawdown of 23.87 feet occurred at Well TW-1. No testing data was available for Well TW-1.

Coordination. Commission staff has coordinated with the NRC during review of the project. In October 2006, NRC received a request for approval of an EPU at the SSES that would increase the thermal power limit of the units. NRC has not acted on this request to date but has issued its draft environmental assessment statement for public comment. Commission staff has reviewed the environmental assessment and provided NRC staff with this docket for coordination with its permits.

Findings

The project is subject to Commission approval, monitoring, and reporting requirements, as per Commission Regulations §806.4(a)(1)(iii), §806.22, §806.23, and §806.30.

All water evaporated or otherwise lost from the cooling system or other power generation processes is considered to be a consumptive water use subject to Commission regulation.

As part of its application, PPL submitted a water use monitoring plan that proposes the continued use of cooling tower performance diagrams to account for daily consumptive water use. PPL also proposed replacement of two of the four carbon steel intake pipes with stainless steel pipes to eliminate the corrosion and fouling problems that prevent accurate metering. Commission staff has reviewed the plan and finds it to be acceptable as an interim measure, with modifications to account for evaporation off the spray pond.

However, as the SSES has demonstrated, it can successfully meter quantities of water well in excess of the amount withdrawn from any single pump located at the Susquehanna River intake structure to an accuracy within 2.5 percent. Commission staff recommends that PPL propose a permanent method to quantify the daily consumptive water use based on metering rather than estimation and averaging. The permanent monitoring plan should contain metering, accurate to within five percent, on the total water withdrawal from the Susquehanna River, on groundwater pumped from Wells TW-1 and TW-2, on the wastewater discharge on the diffuser discharge and other locations, as appropriate, as well as a schedule for implementation for review and approval by Commission staff. The plan should also contain a methodology to account for the instream evaporative loss that occurs as a result of the thermal loading from the diffuser discharge.

Should metering of the stainless steel intake pipe not provide improved accuracy, Commission staff will evaluate other proposed methods of measurement for suitability.

Should the proposed accounting procedure fail to measure the SSES's consumptive water use and total water withdrawal from the Susquehanna River, the Commission reserves the right to modify the measuring, monitoring, and accounting procedures. Commission staff will provide the project sponsor with prior written notice of any required change in the measuring,

monitoring, and accounting procedures. Any alternative measuring, monitoring, or accounting procedure requested by the project sponsor must be reviewed and approved by Commission staff.

Although the Docket currently requires that the project sponsor keep daily records of consumptive water use and report these data to the Commission annually, Commission staff recommends that the reporting frequency be changed to quarterly, as specified in Commission Regulation §806.30(b)(1).

The project was previously approved for the consumptive use of 40.000 mgd of water on a 30-day average, not to exceed a daily peak usage of 48.000 mgd. PPL has requested approval of up to 48.000 mgd as a peak day and the elimination of the requirement that limits the 30-day average consumptive water use to 40.000 mgd. Commission staff recommends approval of the requested increase of consumptive water use of up to 48.000 mgd (peak day).

The project's consumptive use of water is subject to mitigation requirements, as per Commission Regulation §806.22. Currently, as approved in the Docket, consumptive water use mitigation is provided by releases of water from the Cowanesque Reservoir to the Susquehanna River during periods of low flow, under an Operations/Release Plan approved by Commission Resolution No. 89-12. That plan prescribes the amounts of releases to be made whenever the natural flow at Wilkes-Barre and/or Harrisburg is less than or equal to Q7-10 flow plus the amount of consumptive use. This mitigation method applies to full or partial operation of the SSES, but not when both Units 1 and 2 are shut down.

The project sponsor proposes to continue utilizing the current method to satisfy its water mitigation requirements. Provided that the project sponsor continues to comply with the terms of the Contract, Commission staff finds that PPL may continue to use the releases of water storage from the Cowanesque Reservoir to mitigate up to 40.000 mgd based on a 30-day average of consumptive water use. Commission staff recommends that the approved method of mitigation for consumptive use in excess of 40.000 mgd based on a 30-day average be payment of the Commission's prevailing consumptive use fee.

The existing surface water withdrawal predates the effective date of Commission Regulation §806.4(a)(2)(iv); however, the project sponsor's increase in withdrawal from the Susquehanna River related to the proposed EPU triggers Commission review and approval. Commission staff recommends approval of the requested surface water withdrawal of up to 66.000 mgd (peak day), as submitted by the project sponsor.

The use of Wells TW-1 and TW-2 predates July 13, 1978, and did not previously require approval by the Commission. The project sponsor has requested waivers from the Commission's required aquifer testing for the wells, and submitted a 1992 aquifer test report for Well TW-2. Commission staff recommends approval of the waivers. Pumping at Wells TW-1 and TW-2 at the requested rates is not expected to cause any adverse impacts to other groundwater users, as there are no nearby wells.

Commission staff recommends approval of a 30-day average withdrawal of 0.072 mgd from Well TW-1 and 0.125 mgd from Well TW-2, and a total groundwater withdrawal of

0.125 mgd. Commission staff recommends approval of peak instantaneous pumping rates of 50 gpm for Well TW-1 and 150 gpm for Well TW-2, the capacities of the well pumps.

The project is subject to Commission monitoring and reporting requirements, as per Commission Regulation §806.30. The project sponsor should install appropriate meters on its surface water withdrawal from the Susquehanna River, and monitor its withdrawal daily. Currently, one meter is used to measure withdrawals from both wells. Commission staff recommends that the project sponsor maintain the meter for Wells TW-1 and TW-2, and monitor withdrawals daily. The project sponsor should report withdrawal data from surface water and groundwater to the Commission quarterly.

The second ("measurement uncertainty recapture") uprate was implemented by the project sponsor at Units 1 and 2 in 2001 and 2002, respectively. No request for approval of increase in surface water withdrawal was submitted to the Commission for this second uprate. Commission staff contends that the modifications made in 2001 and 2002 as a result of the second uprate caused an increase in the amount of water withdrawn at the project in excess of 100,000 gallons per day (gpd) above that which it was withdrawing prior to May 11, 1995. Therefore, the increase triggered Commission approval pursuant to §803.44(a)(2) of the regulations in effect at that time. The project sponsor does not agree with Commission staff; however, the project sponsor has offered a settlement to the Commission to resolve this matter. Commission staff recommends acceptance of the project sponsor's proposed settlement.

The project sponsor has paid the appropriate application fee, in accordance with Commission Regulation §806.16, and in accordance with Commission Resolution No. 2005-03. The project sponsor has requested a waiver of the Commission's required notice of the groundwater withdrawal application, based on the wells remote location, the amount of withdrawal, and the historic operation. Commission staff recommends approval of the request. The project sponsor has provided all other proofs of notification, as required by Commission Regulation §806.15.

No adverse impacts to other area surface water or groundwater withdrawals are anticipated. The project is physically feasible, does not conflict with or adversely affect the Commission's Comprehensive Plan, and does not adversely influence the present or future use and development of the water resources of the basin.

PPL has requested that the Commission extend the term of approval to coincide with its requested 20-year renewal of the NRC license for the SSES (through March 23, 2044). The requested 37-year term of approval has not been approved by NRC and is much longer than the Commission's standard 15-year term for new approvals. In consideration of these facts, Commission staff recommends that this approval remain effective until March 9, 2025, the term of the prior Docket approval.

Decision

1. Commission Docket No. 19950301, as approved March 9, 1995, is hereby modified to approve the surface water withdrawal of up to 66,000 mgd (peak day) from the Susquehanna

River; the groundwater withdrawal (30-day averages) of 0.072 mgd from Well TW-1 and 0.125 mgd from Well TW-2, and a total groundwater withdrawal of 0.125 mgd; and the consumptive water use of up to 48.000 mgd (peak day) pursuant to Article 3, Section 3.10, of the Compact.

2. The project's 30-day average consumptive use limit of up to 40.000 mgd is rescinded.

3. The foregoing findings are hereby adopted and shall be incorporated into and made a part of this decision.

4. Conditions "a," "b," "d," and "e" of the existing approval (Docket No. 19950301) are hereby rescinded.

5. The project sponsor shall comply with all Commission regulations, including monitoring and reporting requirements, as per Commission Regulation §806.30.

6. Within one hundred twenty (120) days from the date of this approval, the project sponsor shall submit a plan to the Commission for review and approval by Commission staff that accounts for all water withdrawn from the Susquehanna River and the total consumptive water use at the facility. The project sponsor shall propose a methodology to account for their consumptive water use based on metering or other approved methods, rather than estimation. Following approval, the project sponsor shall execute the plan and complete any installation of meters in accordance with the approved schedule, but not longer than four (4) years from the date of this approval. The project sponsor shall notify the Commission, in writing, when the meters are installed and certify the accuracy of the measuring devices to within five (5) percent of actual flow. The project sponsor shall notify the Commission when the monitoring plan has been fully implemented.

7. The project sponsor shall keep daily records of the project's consumptive water use, and shall report the data to the Commission quarterly, and as otherwise required. Quarterly monitoring reports shall be submitted on-line and are due within thirty (30) days after the close of the preceding quarter. The daily quantity of water consumptively used shall be the quantity evaporated or otherwise lost from the cooling system or other power generation processes, including losses from the river surface due to thermal loading.

8. The project sponsor shall, as an interim measure, account for total consumptive water use at the facility using the procedures outlined in the water monitoring plan modified to account for evaporation off of the spray pond and off the river surface due to thermal loading. Within thirty (30) days from the date of this approval, the project sponsor shall submit the modified water monitoring plan to the Commission for review and approval by Commission staff. The interim monitoring measure shall expire four (4) years from the date of this approval.

9. The project sponsor shall keep daily records of the metered withdrawal from Wells TW-1 and TW-2. The required reporting data shall be submitted to the Commission quarterly, and as otherwise required. Monitoring reports shall be submitted on-line and are due within thirty (30) days after the close of the preceding quarter.

10. The maximum instantaneous rate of production from Wells TW-1 and TW-2 shall not exceed 50 gpm and 150 gpm, respectively, and the wells shall not be operated simultaneously.
11. The project sponsor shall maintain the meter for Wells TW-1 and TW-2, accurate to within five (5) percent, to measure its groundwater withdrawal.
12. The project sponsor shall keep daily records of the project's surface water withdrawal and shall report the data to the Commission quarterly, and as otherwise required. Quarterly monitoring reports shall be submitted on-line and are due within thirty (30) days after the close of the preceding quarter.
13. The project sponsor shall maintain any meters or other measuring devices approved by the Commission, accurate to within five (5) percent, so as to provide a continuous, accurate record of withdrawals and uses, and certify to the Commission once every five (5) years, or as otherwise requested, the accuracy of all measuring devices and methods to within five (5) percent of actual flow.
14. The project sponsor has offered a settlement by agreement pursuant to Commission Regulation §808.18, in the amount of \$500,000, for its alleged noncompliance with Commission regulations, and is hereby accepted. Except where the full amount of same has been tendered to the Commission in advance hereof, this action shall be contingent upon, and shall not be effective until payment of the settlement amount is made to the Commission or arrangements for such payment have been made that are acceptable to the Executive Director of the Commission. Failure to make such payment or payment arrangement with the Commission within forty-five (45) days hereof shall render this approval null and void.
15. The project sponsor shall comply with applicable Commission water conservation requirements as per Commission Regulation 806.25(b).
16. To satisfy the Commission's current mitigation requirements for consumptive water use set forth in Commission Regulation §806.22, the project sponsor shall continue to comply with the terms set forth in a Contract with the Commission for water supply storage at the Cowanesque Reservoir and make quarterly payments to the Commission based on the rate of \$0.14 per 1,000 gallons of water consumptively used by the project in excess of 40,000 mgd based on a 30-day average. The daily quantity of water consumptively used shall be the quantity evaporated or otherwise lost from the cooling system or other power generation processes. Payment amounts shall be calculated by applying this rate to the 30-day average amount of water used consumptively by the project, calculated daily, in excess of 40,000 mgd. Quarterly payments are due and payable within thirty (30) days after the close of the preceding quarter. The rate of payment, after appropriate notice to consumptive users of water using this method of compliance, is subject to change at the Commission's discretion.
17. The notification requirements specified in Commission Regulation §806.15 are hereby waived for the groundwater withdrawal application.

18. The constant-rate aquifer testing requirements specified in Commission Regulation §806.12 are hereby waived.

19. If the Commission determines that the operation of the project's groundwater withdrawal from Wells TW-1 and TW-2 adversely affects any existing groundwater or surface water withdrawal, the project sponsor shall be required to provide, at its expense, an alternate water supply or other mitigating measure.

20. To satisfy the Commission's registration requirement, the project sponsor shall register with the Pennsylvania Department of Environmental Protection all surface water and groundwater sources described in this docket in accordance with the Pennsylvania Water Planning Act (Pennsylvania Act 220).

21. Commission approval shall not be construed to exempt the project sponsor from obtaining all necessary permits and/or approvals required for the project from other federal, state, or local government agencies having jurisdiction over the project. The Commission reserves the right to modify, suspend, or revoke this action if the project sponsor fails to obtain or maintain such approvals.

22. If the project sponsor fails to comply with the provisions of the Compact or any rule, regulation, or order of the Commission, or any term or condition of this docket, the project is subject to enforcement actions pursuant to Commission Regulation §808.

23. The Commission reserves the right to reopen any project docket or issue such additional orders, as may be necessary, to mitigate or avoid adverse impacts or otherwise to protect public health, safety, welfare, or the environment.

24. Commission approval confers no property rights upon the project sponsor. The securing of all rights necessary and incident to the project sponsor's development and operation of the project shall be the sole and exclusive responsibility of the project sponsor, and this approval shall be subject thereto.

25. All other conditions in Commission Docket No. 19950301 not inconsistent herewith shall remain effective.

26. Based on Commission Regulation §806.31(a), this approval is effective until March 9, 2025. The term of this docket modification is in accordance with the term of the prior Docket approval. As specified in Commission Regulation §806.31(e), if the project sponsor submits a renewal application no later than September 9, 2024, the existing approval shall be deemed extended until such time as the Commission renders decision on the application.

27. If the project is discontinued for such a period of time and under such circumstances that an abandonment of the project may reasonably be inferred, the Commission may rescind the approval of the project unless a renewal is requested by the project sponsor and approved by the Commission.

By the Commission:

Dated: September 12, 2007



Cathleen C. Myers, Chair
Pennsylvania Commissioner

Enclosure 5

RAI H 2.3-2
PADEP Water Withdrawal Data
Luzerne County Pennsylvania
(One Compact Disc)