August 1, 2007

Mr. Britt T. McKinney
Sr. Vice President
and Chief Nuclear Officer
PPL Susquehanna, LLC
769 Salem Blvd., NUCSB3
Berwick, PA 18603-0467

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION (RAI) - SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 (SSES 1 AND 2) - EXTENDED POWER UPRATE APPLICATION RE: REACTOR SYSTEMS TECHNICAL REVIEW (TAC NOS. MD3309 AND MD3310)

Dear Mr. McKinney:

In reviewing your letter dated July 30, 2007 (PLA-6250), concerning a request for additional information, the Nuclear Regulatory Commission staff has determined that follow-up information contained in the enclosure to this letter is needed to complete its review. These questions were discussed with your staff during a teleconference on July 31, 2007. We request you respond by August 15, 2007.

If you have any questions, please contact me at 301-415-1030.

Sincerely,

/ra/

Richard V. Guzman, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-387 and 50-388

Enclosure:
RAI

cc w/encl: See next page

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DATE	8/1/07	8/1/07	8/1/07	8/1/07

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REQUEST FOR ADDITIONAL INFORMATION (RAI)

RELATING TO THE

APPLICATION FOR EXTENDED POWER UPRATE (EPU)

SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 (SSES 1 AND 2)

PPL SUSQUEHANNA, LLC

DOCKET NOS. 50-387 AND 50-388

On July 30, 2007, PPL responded to the Nuclear Regulatory Commission (NRC) staff's RAI regarding a 0.05 square-foot (ft^2) small break loss-of-coolant accident (SBLOCA) question. The SSES 1 and 2 analyses resulted in a peak clad temperature of 1290 degrees Fahrenheit (°F). In reviewing the results provided by PPL, the NRC staff has identified follow-up questions regarding the modeling for counter current flow and timing during the event. The NRC staff has determined that these questions are needed to complete its review.

1. Counter-current flow limitation (CCFL) model: In Figure A.27 of the SSES 1 and 2, July 30, 2007, response, the hot rod peak clad temperature (PCT) curve drops at about 12 seconds after the low pressure core spray (LPCS) starts. It appears that the top spray cooling from LPCS dominates over a bottom reflood cooling effect, such that the CCFL effect is not obvious. Please justify the CCFL model and spray heat transfer.

   A) Provide the reference and/or description of the models governing CCFL at the exit to the hot bundle/core. Also, identify the reference that describes the validation (separate effects and integral test data comparisons) of the CCFL limit model governing top down cooling in rod bundles.

   B) Provide plots of the liquid and vapor velocities at the exit to the core average and hot bundle regions. Also, mass flow into the hot bundle.

   C) Provide the liquid levels and two phase levels in the core average and hot bundle regions.

   D) Provide the limiting top skewed axial power shape used in the SBLOCA analyses.

   E) Provide the steam and liquid velocities at the inlet and outlet to the core bypass region.

   F) Provide the reference, XN-NF-80-19 (p)(a) Vol.2, 2A, 2B and 2C.

2. Perform and provide the results from the same 0.05 ft^2 SBLOCA analysis using a conservative bottom up reflooding of the hot bundle (i.e., no top down cooling from the core spray entering the top of the bundle from the upper plenum).

3. The heat up period before the safety injection is expected to be longer than shown in the SSES 1 and 2 limiting node quality plot (Figure A.24). Additionally, the quality stays lower than expected (about 0.06) for about 110 seconds (365 seconds to 475 seconds) before the heat up, and the heat up time before LPCS starts is about 83 seconds. It is expected that the heat up would be significantly longer and thus, the PCT would be higher than reported in the SSES 1 and 2 analyses. Since it is a top-peaked profile, the quality (void fraction) before heat up seems to be low and heat up time seems to be short. Please provide justification for the low limiting node quality and the short heat up time. If this is related to the modeling of LPCS cooling and CCFL, include this reasoning in your justification.

Susquehanna Steam Electric Station Units 1 and 2

cc:

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