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U. S. Nuclear Regulatory Commission
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Mail Stop OP1-17
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
UNIT 1 OPERATING LICENSE NO. NPF-14
LICENSE CONDITIONS 2.C. (37) (a) and 2.C. (37) (b)
AND UNIT 2 OPERATING LICENSE NO. NPF-22
LICENSE CONDITIONS 2.C. (21) (a) AND 2.C. (21) (b)
SUPPLEMENT 1 TO PLA-6451 RE: RESPONSE TO RAIs **Docket Nos. 50-387**
PLA-6481 **and 50-388**

Reference: 1) NRC Letter from B. K. Vaidya (NRC) to B. T. McKinney (PPL), "Corrections to Amendment Nos. 246 and 224 Regarding the 13 Percent Extended Power Uprate," dated May 5, 2008.

2) PLA-6451 from W. H. Spence (PPL) to Document Control Desk (USNRC), "Unit 1 Operating License No. NPF-14 License Conditions 2.C. (37) (a) and 2.C. (37) (b) and Unit 2 Operating License No. NPF-22 License Conditions 2.C. (21) (a) and 2.C. (21) (b)," dated November 18, 2008.

The purpose of this letter is to provide PPL Susquehanna, LLC's (PPL) responses to NRC's Request for Additional Information (RAIs) associated with Reference No. 2, which were discussed with the NRC Staff in telephone calls on February 6 and March 20, 2009. In addition, this letter provides additional information in support of PPL's request of not performing a condensate pump trip at the full Constant Pressure Power Uprate (CPPU) power level as required by Unit 1 and Unit 2 License Conditions (see Reference No. 1). The effect of delaying implementation of the full CPPU power level on Susquehanna SES Unit 2 on PPL's request not to perform a condensate pump trip at the full CPPU power level is also provided.

Attachment 1 contains PPL's responses to the NRC's Request for Additional Information.

Attachment 2 contains additional information in support of PPL's request not to perform a condensate pump trip from the full CPPU power level.

Due to software development schedule issues with the planned implementation of the digital Integrated Control System (ICS), PPL has decided to postpone the installation of both the new reactor feed pump turbines and their speed control system (ICS) on Unit 2

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until spring of 2011. With the postponement of the installation of ICS and the reactor feed pump turbines, Unit 2 will not be capable of achieving the full CPPU power level this cycle.

Barring any additional software schedule or testing issues, ICS and new reactor feed pump turbines will be installed on Unit 1 during the spring 2010 outage. Unit 1 will now be the first unit to achieve the full CPPU power level.

In our November 18, 2008 letter (Reference No. 2), PPL stated that the condensate pump trip from the full CPPU power level as required by Unit 1 Operating License No. NPF-14 License Condition 2.C. (37) (b) and Unit 2 Operating License No. NPF-22 License Condition 2.C. (21) (b) need not be performed based on the following:

> "...the results of the condensate pump trip test for Unit 1 at 3733 MWt, an anticipated successful condensate pump trip test for Unit 2 at 3733 MWt and the simulator and static model predictions,..."

When our November 18, 2008 letter was written, the Unit 2 condensate pump trip at 3733 MWt was to be performed with all CPPU modifications (e.g. ICS installed and reactor feed pump turbines replaced) completed. Since Unit 1 is now the lead unit for achieving full CPPU power, PPL proposes the following tests in order to justify not performing the condensate pump trip at the full CPPU power level:

- Test: Condensate pump trip on Unit 2 at 3733 MWt as required by License Condition 2.C. (21 (a).

  Basis: The conditions for the Unit 2 trip will be similar to those for the Unit 1 test except an additional condensate filter and demineralizer will be installed on Unit 2. PPL anticipates that the installation of the additional filter and demineralizer will have little or no effect on the results of the pump trip when compared to Unit 1. This trip will be used to demonstrate that the performance of Units 1 and 2 are similar.

- Test: Condensate pump trip on Unit 1 at 3733 MWt after the installation of ICS, new reactor feed pump turbines, and a condensate filter and demineralizer will be used to demonstrate the unit's capability after all CPPU modifications are installed.

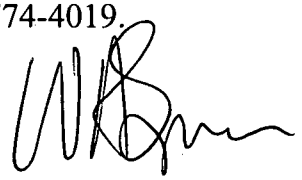
  Basis: This test will be completed provided that the NRC determines that successful completion of this test along with the successful completion of the Unit 1 and Unit 2 tests (prior to completion of all CPPU modifications) at 3733 MWt fulfills License Conditions 2.C. (37) (b) for Unit 1 and License Condition 2.C. (21) (b) for Unit 2.

Based on the results of the completed condensate pump trip test for Unit 1 at 3733 MWt, an anticipated successful condensate pump trip test for Unit 2 at 3733 MWt, an anticipated successful condensate pump trip test for Unit 1 at 3733 MWt with the CPPU modifications installed, and the simulator and static model predictions, PPL believes that the analysis provided demonstrates that performing a condensate pump trip test from between 3872 MWt to 3952 MWt power level is unnecessary and thus fulfills the requirements of License Conditions 2.C. (37) (b) and 2.C. (21) (b).

This letter contains no regulatory commitments.

We request that this request be approved by November 1, 2009.

Any questions regarding this letter should be directed to Mr. Cornelius T. Coddington at (610) 774-4019.



W. H. Spence

Attachment 1 – Response To NRC's Request For Additional Information
Attachment 2 – Additional Information In Support Of PPL's Request

Copy: NRC Region I
Mr. R. R. Janati, DEP/BRP
Mr. F. W. Jaxheimer, NRC Sr. Resident Inspector
Mr. B. K. Vaidya, NRC Project Manager

Attachment 1 to PLA-6481

Response to NRC's Request For Additional Information

REQUEST FOR ADDITIONAL INFORMATION BY THE BALANCE OF PLANT BRANCH (SBPB) REGARDING A REQUEST FOR A LETTER SATISFYING CONDENSATE PUMP TRIP TEST LICENSE CONDITIONS FOR SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 (TAC NOS. ME0223 AND ME0224) DOCKET NOS: 50-387 AND 50-388

By letter dated November 18, 2008, PPL Susquehanna, LLC, (PPL), the licensee for Susquehanna Steam Electric Station (SSES), Units 1 and 2, requested a letter from the NRC. The licensee requested that the letter state that completion of the tests specified in License Conditions 2.C.(37)(a) and 2.C.(21)(a) for SSES Units 1 and 2, respectively, adequately demonstrate that a single condensate pump trip will not result in a loss of all feedwater and that a test performed at 3952 MWt is not required. This letter would satisfy License Conditions 2.C.(37)(b) and 2.C.(21)(b) for SSES Units 1 and 2, respectively. The letter would have the effect of releasing the licensee from the alternative requirement to perform a test at either unit during the power ascension test program demonstrating that a loss of one condensate pump would not cause a total loss of feedwater while operating at 3872 MWt to 3952 MWt (98% to 100% of the full CPPU power level) with feedwater and condensate flow rates stabilized.

In order to complete its review, the staff determined the following information is necessary:

NRC RAI-1:

In the staff safety evaluation of the SSES Constant Pressure Power Uprate (ADAMS Document Accession Number ML0810002301), the staff states that condensate pump trip testing is necessary at the intermediate power level of 3733 MWt for both units because of the extent of condensate and feedwater system modifications required to implement the proposed power uprate. Of the condensate and feedwater system modifications listed in Section 2.5.4.4 of the staff safety evaluation, identify the modifications that were completed prior to performance of the condensate pump trip test at Unit 1 on May 16, 2008, and those that are expected to be completed prior to performance of the identical test for Unit 2. If any of the listed modifications were not complete or are not expected to be complete at the time of the test, describe the effect that implementation of the modification would have on the margin to feedwater pump trips.

PPL RESPONSE:

Section 2.5.4.4 of the staff safety evaluation lists the following condensate and feedwater system (CFS) modifications:

1. replacement of condensate pump impellers with high head pump impellers,
2. modification of condensate pump minimum flow valves to support higher flow rates,
3. modification of all three reactor feed pump (RFP) turbines to support higher speeds, and
4. modification of RFP suction pressure trip setpoint and time delay.

Modifications 1, 2, and 4 have been installed on both Susquehanna Steam Electric Station (SSES) Units and were completed on Unit 1 prior to the May 16, 2008 pump trip test. The installation of three new RFP turbines (modification number 3) will not be completed prior to the Unit 2 condensate pump trip at 3733 MWt. An additional condensate filter and demineralizer are being installed in Unit 2.

The condensate pump trip test for Unit 2 is expected to produce results similar to the Unit 1 test. The new RFP turbines must be installed to be able to attain the required initial power level for the condensate pump trip test above 98% power. Therefore, all of the listed modifications must be complete in order to perform the test above 98% power.

NRC RAI-2:

In the letter dated November 18, 2008, PPL relies on the margin to feedwater pump low suction pressure trip setpoint or reset values and margin to time delay setpoints to conclude that uncertainty in the analysis is unimportant. Describe the extent of testing and calibration completed for the feedwater pump low suction pressure trip devices since the devices were reset for implementation of the power uprate.

PPL RESPONSE:

Based on the clarifications received during the March 20, 2009 phone call between PPL and the NRC staff, this response provides a discussion on the testing associated with the implementation of the digital Integrated Control System (ICS).

Testing of ICS will be in two major stages that includes a Factory Acceptance Test (FAT) and a Site Acceptance Test (SAT). The FAT is performed in two steps. The first step of the FAT checks the system hardware. System power supplies and wire terminations are some of the items that are checked during the hardware FAT. The second step of the FAT checks the system software to ensure that the logic is working properly. The inputs

to the ICS are simulated during the software FAT to ensure that the proper response is obtained at the outputs.

The inputs to the ICS can be generated as a direct digital input or through the conversion of a signal from an analog device to a voltage or current based signal. The interface where the signal is supplied is referred to as the Field Bus Module (FBM). The FBM serves as the interface between field devices and the digital components of ICS. The FBM is also used to generate output signals that can be used in the field. In summary, the FAT tests the ICS from its inputs through the software driven digital components to the outputs. This test assures that the inputs and outputs are connected correctly and that the logic works properly between the associated inputs and outputs.

The Site Acceptance Test (SAT) confirms the integration of ICS with the connections to and from the field. The ICS system has the capability to indicate field device signals. As each instrument is calibrated in the field, ICS mimics the calibration instrument. This function of ICS is used to ensure that the ICS inputs have been properly scaled. This provides an overlap between the testing of the FBMs during the FAT and the signals from the field devices to the digital components of ICS to ensure that input and output scaling is correct.

The suction pressure trip function is tested during the FAT and the SAT. The hardware FAT ensures that the FBM connections for the suction pressure trip were properly integrated with the digital components of ICS. The software FAT tests the logic for the trip function including the starting of the timer for a simulated pressure signal and the trip output from the timing out of the timer for each RFP. The SAT confirms that the suction pressure transmitter for each RFP was scaled correctly. The pressure trip setpoints and the timer delays are also tested. These tests ensure that the low suction pressure trip function in ICS will perform as expected to protect the RFPs from cavitation.

NRC RAI-3:

In the next-to-last paragraph of the letter dated November 18, 2008, PPL states, in part, that:

> ...NRC is requested to issue PPL a letter notifying us that the tests specified in License Conditions 2.C. (37) (b) and 2.C. (21) (b) adequately demonstrate that a single condensate pump trip will not result in a loss of all feedwater....

The staff believes that PPL intended the above statement to refer to tests completed pursuant to License Conditions 2.C. (37) (a) and 2.C. (21) (a) for Units 1 and 2,

respectively. Please confirm which license condition PPL intended to reference in the statement cited above.

PPL RESPONSE:

The intent was that the tests performed for License Conditions 2.C. (37) (a) and 2.C. (21) (a) for Units 1 and 2 were sufficient to preclude performing a trip of a condensate pump from full Constant Pressure Power Uprate (CPPU) power level as required by License Conditions 2.C. (37) (b) and 2.C. (21) (b) for Units 1 and 2. Therefore, the intended referenced License Conditions should have been License Conditions 2.C. (37) (a) and 2.C. (21) (a) for Units 1 and 2, respectively.

Attachment 2 to PLA-6481

Additional Information On PPL's Request To Not Perform A Condensate Pump Trip From Full CPPU Power

ADDITIONAL INFORMATION:

PPL has recently determined that the response to the tripping of a condensate pump at the full Constant Pressure Power Uprate (CPPU) power level warrants further discussion. It was determined that if a condensate pump were tripped with the associated Recirculation System Runback from the full Constant Pressure Power Uprate (CPPU) power level, the unit has the potential to exceed the MELLLA boundary (an operating boundary on the Power/Flow map) depending on the initial rod line. This would result in the Unit operating in the restricted region of the power flow map.

The condensate pump trip simulation at the full CPPU power level of 3952 MWt used an initial core flow of 105 Mlb/hr that resulted in the final state of the reactor ending essentially on the MELLLA boundary at 74% power and 63 Mlb/hr core flow. It is predicted that starting the test from a lower rod line within the required test condition could add up to approximately 3% power margin to the MELLLA boundary at the final anticipated test condition. However, depending upon predictive accuracy, the transient margin to the MELLLA boundary could still be less than 3%, with the potential for the MELLLA boundary to be exceeded.

Exceeding the MELLLA boundary would result in a power-to-flow condition that is not within the region permitted for steady state operation. Because the Core Operating Limits Report (COLR) is based upon analyses, which assume operation at rod lines that are within the MELLLA domain, operation above the MELLLA boundary would create an operational state for which the Technical Specifications 3.2, Power Distribution Limits, (LCOs 3.2.1, 3.2.2, and 3.2.3) would no longer be met. This would thus necessitate that PPL take the action to restore thermal limits within 2 hours as directed by Action A.1 of the respective LCOs. While PPL has procedures to restore the affected unit to within the normal operating domain if such a transient were to occur, PPL believes that the NRC should re-examine the benefit of having PPL conduct the 3952 MWt condensate pump trip test at the expense of potentially placing the unit outside of the licensing basis domain for steady state operation.

Xerox WorkCentre
Network Scanning Confirmation Report

XEROX

Job Details:

Job Information

Device Name:	XRX0000AA7BA1E8
Submission Date:	04/15/09
Submission Time:	09:38 AM

File Settings

Format:	Image-Only PDF
Images Filed:	11
Bytes Filed:	409005

Scan Settings

Images Scanned:	11
Original Type:	MIXED
Original Size:	AUTO
Auto Exposure:	0
Lighten/Darken:	4
Contrast:	4
Sharpness:	4
Sides Imaged:	ONE SIDED
Resolution:	RES 300 x 300
Bits per Pixel:	1
Output Color:	BLACK_AND_WHITE
Compression Quality:	128
Compression:	MRC_2LAYER_MULTI

Job Status:
1 out of 1 filed successfully.

Destination 1: **Status..... SUCCESS**

Status Details:	
Friendly Name:	HRE3 Scanning
Server Name:	167.155.20.122:21
Path:	/hre3
Protocol:	FTP
Filing Policy:	NEW_AUTO_GENERATE
Document Name:	DOC

Destination 2: **Status.....**

Status Details:	
Friendly Name:	
Server Name:	
Path:	
Protocol:	
Filing Policy:	
Document Name:	

Destination 3: **Status.....**

Status Details:	
Friendly Name:	
Server Name:	
Path:	
Protocol:	
Filing Policy:	
Document Name:	

Destination 4: **Status.....**

Status Details:	
Friendly Name:	
Server Name:	
Path:	
Protocol:	
Filing Policy:	
Document Name:	

Destination 5: **Status.....**

Status Details:	
Friendly Name:	
Server Name:	
Path:	
Protocol:	
Filing Policy:	
Document Name:	

Destination 6: **Status.....**

Status Details:	
Friendly Name:	
Server Name:	
Path:	
Protocol:	
Filing Policy:	
Document Name:	