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U.S. Nuclear Regulatory Commission
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Washington, DC 20555

**SUSQUEHANNA STEAM ELECTRIC STATION
REQUEST FOR ADDITIONAL INFORMATION
REGARDING PROPOSED AMENDMENT NO. 194
TO LICENSE NPF-22: MCPR SAFETY LIMITS
PLA-5263**

Docket No. 50-388

Reference: 1) NRC RAI, R. G Schaaf to R. G. Byram, "Request for Additional Information Related to Minimum Critical Power Ratio Safety Limits Technical Specification Change Request (TAC NO. MA8540)" dated November 21, 2000.

The purpose of this letter is to respond to your Request for Additional Information (RAI) [Reference 1]. The proposed change updates the MCPR Safety Limits in the Unit 2 TS Section 2.1.1.2.

The RAI questions and our responses are contained in Attachment 1.

If you have any questions, please contact Mr. M. H. Crowthers at (610) 774-7766.

Sincerely,

G. T. Jones

Attachment

copy: NRC Region I
Mr. S. Hansell, NRC Sr. Resident Inspector
Mr. R. G. Schaaf, NRC Project Manager
Mr. D. J. Allard, PA DEP

A001

**BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION**

In the Matter of

:

PPL Susquehanna, LLC

:

Docket No. 50-388

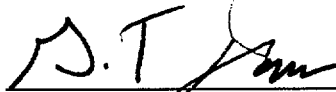
**REQUEST FOR ADDITIONAL INFORMATION REGARDING
PROPOSED AMENDMENT NO. 194 TO LICENSE NPF-22:
MCPR SAFETY LIMITS**

Licensee, PPL Susquehanna, LLC, hereby files a revision to its Facility Operating License No. NPF-22 dated March 23, 1984.

This amendment contains a revision to the Susquehanna SES Unit 2 Technical Specifications.

PPL Susquehanna, LLC

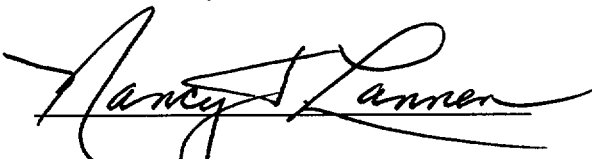
By:



G. T. Jones

Vice-President - Nuclear Engineering & Support

Sworn to and subscribed before me
this *1st* day of *December*, 2000.


Notary Public

Notarial Seal
Nancy J. Lannen, Notary Public
Allentown, Lehigh County
My Commission Expires June 14, 2004

Attachment 1 to PLA-5263

**Response to Request
for Additional Information**

Response to Request for Additional Information MCPR Safety Limits

RAI 1

By letter dated October 30, 2000, the PPL Susquehanna, LLC submitted an application for an increase in the licensed power level of the Susquehanna Steam Electric Station (SSES), Units 1 and 2. The October 30, 2000 application requested an increase in licensed power level from 3441 MWt to 3489 MWt, an increase of 1.4 percent. The March 20, 2000 letter, which proposed a revision to the Unit 2 minimum critical power ratio (MCPR) safety limit was evaluated at a power level of 3493 MWt, which represents a 1.5 percent increase in power level. Describe the basis for the power level increase reflected in the MCPR safety limit analysis (from 3441 MWt to 3493 MWt, a 1.5 percent increase). Describe the impact of the proposed power increase on the MCPR safety limit values for SSES Unit 2 Cycle 11 operation.

Response

As described in the March 20, 2000 letter, the Unit 2 Cycle 11 cycle specific Minimum Critical Power Ratio Safety Limit (MCPR SL) was performed based on a core power of 3493 MWt (101.5% of 3441 MWt). This analysis was performed using the NRC approved methodology listed in Section 5.6.5 of the Unit 2 Technical Specifications. This analytical power level of 3493 MWt was purposefully chosen to conservatively bound the proposed uprated core power level of 3489 MWt (101.4% of 3441 MWt) described in the October 30, 2000 letter. This bounding value for core power was utilized to ensure that the core power used to determine the MCPR SL in the Safety Limit analysis bounds core power levels up to and including 3493 MWt.

In the Safety Limit calculation, a higher core power will produce a flatter radial power distribution due to void feedback effects. With a flatter core radial power distribution, more pins will be (calculated) in boiling transition. To limit the number of pins in boiling transition, a more conservative Safety Limit must be imposed. Hence, an analysis at a higher core power is more conservative than an analysis done at a lower core power. Thus, the MCPR SL values proposed in the March 20, 2000 letter are conservative for both the current rated power (3441 MWt) and the proposed uprated power (3489 MWt).

RAI 2

A mixed core was used for SSES Unit 2 Cycle 10 operation while a homogeneous core of ATRIUM-10 fuel will be used for Cycle 11 operation. However, no changes have been proposed to the SSES Unit 2 Technical Specification 5.6.5.b list of approved methodologies used to determine core operating limits. Specify the approved methodologies used for Unit 2 Cycle 11 analysis. Provide justification that the proposed increase of the MCPR safety limit values for Cycle 11 operation are conservative with respect to the previous mixed core MCPR safety limit values and describe the reason for the increase.

Response

References in TS Section 5.6.5 relating to the Siemens Power Corporation 9x9-2 and GE12 fuel are retained in TS Section 5.6.5 as contingency should use of a bundle of these types be required. The applicable 9x9-2 and GE12 references in TS Section 5.6.5 are as follows:

3. XN-NF-85-67 (P)(A), Revision 1, "Generic Mechanical Design for Exxon Nuclear Jet Pump BWR Reload Fuel," Exxon Nuclear Company, Inc., September 1986.
6. ANF-1125 (P)(A) and ANF-1125 (P)(A), Supplement 1, "ANFB Critical Power Correlation," April 1990.
7. NEDC-32071P, "SAFER/GESTR-LOCA Loss of Coolant Accident Analysis," GE Nuclear Energy, May 1992.
11. PL-NF-94-005-P-A, "Technical Basis for SPC 9x9-2 Extended Fuel Exposure at Susquehanna SES," January 1995.
12. NEDE-24011-P-A-10, "General Electric Standard Application For Reactor Fuel," February 1991.

The remaining references are applicable for a full core of ATRIUM™-10 fuel.

Although unlikely, manufacturing, transportation, operational, and/or refueling event(s) can result in altering the current projected core composition to include SPC 9x9-2 fuel or GE-12 fuel. For example, leaking fuel bundle(s) incurred during operation or damaged bundle(s) during transportation / handling could require the use of 9x9-2 or GE12 fuel. Currently there is no discharged ATRIUM-10 fuel residing in the spent fuel pool. In the

event of a core composition change from that described in the March 20, 2000 letter, PPL would provide an information letter to the NRC providing the new core composition and the basis for the change. It is our intention to include a reduced list of references as part of the next SLMCPR submittal (i.e., for SSES 2 Cycle 12). At that time, a sufficient number of discharged ATRIUM-10 fuel bundles should be available to respond to any unexpected events.

The proposed MCPR Safety Limits proposed in the March 20, 2000 letter are larger than the Unit 2 Cycle 10 values by 0.01 and 0.02 for two-loop and single-loop, respectively. Both Cycle 10 and Cycle 11 analyses used 1000 monte carlo trials to establish the Safety Limit. As discussed in the response to Question 1, a higher core power is more conservative for the MCPR SL analysis since it tends to flatten the core radial power distribution. Thus, the Unit 2 Cycle 11 MCPR SLs are higher as compared to the Cycle 10 values.