R. L. Anderson
Vice President - Nuclear Operations

PPL Susquehanna, LLC
769 Salem Boulevard
Berwick, PA 18603
Tel. 570 542 3883 Fax 570 542-1504
rlanderson@pplweb com

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U. S. Nuclear Regulatory Commission
Attn.: Document Control Desk
Mail Stop OP1-17
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED CHANGE TO THE SSES UNIT 1 AND UNIT 2
TECHNCIAL SPECIFICATION BASES LCO 3.1.7:
PLA-5538

Docket Nos. 50-387
and 50-388

Reference: 1) *Letter, Wayne D. Lanning (NRC) to R. G. Byram (PPL) "Susquehanna Steam Electric Station, NRC Inspection Report 05000387/2001-004, 05000388/2001-004", dated May 21, 2001.*

2) *Response to Task Interface Agreement - TIA 2001-12 Regarding Susquehanna Steam Electric Station (SSES), Units 1 and 2, Design and Licensing Bases for the Standby Liquid Control System (TAC NOS. MB2764 AND MB2844).*

The purpose of this letter is to provide, for NRC approval, a Technical Specification Bases (TSB) change proposed to resolve the concerns related to the Susquehanna Steam Electric Station (SSES) Technical Specification LCO 3.1.7 "Standby Liquid Control (SLC) System" described in References 1 and 2.

During NRC Inspection 2001-004 (Reference 1), NRC identified a concern (documented as an unresolved item URI 05000387; 05000388/2001-004-03) with how PPL addresses the ATWS requirements in the design and licensing basis of SSES Units 1 and 2. As a result, NRC Region I issued TIA-2001-12. NRR provided a response in Reference 2.

Reference 2 provides the response to two questions. PPL concurs with the TIA conclusions regarding the first question and is initiating an FSAR change. The FSAR change will revise the ATWS discussion in the FSAR to eliminate labeling ATWS as a "Beyond Design Basis" event. The change will clearly identify that the ATWS event is considered "an other event specifically addressed in regulation." This characterization is consistent with NEI 97-04 "Design Basis Program Guidelines."

A001

The TSB change proposed herein is responsive to the second TIA question and response. Relative to the second question, the TIA concludes "that the licensee ... must consider the ATWS rule functional requirements for assessing SLC system operability." As described in Attachment 1, PPL believes this concern is resolved with the proposed TSB change, thus NRC approval of this proposal is requested. Attachment 1 to this letter is the supporting justification for this change.

Attachment 2 to this letter contains mark-ups of the applicable TSB pages for SSES Unit 1 and Unit 2.

The Susquehanna SES Plant Operations Review Committee has reviewed these proposed changes.

PPL plans to implement the proposed changes in the spring of 2003. Therefore, we request NRC complete its review of this change by February 1, 2003.

Any questions regarding this request should be directed to Mr. Michael H. Crowthers at (610) 774-7766.

Sincerely,

R. L. Anderson

Attachments:
Attachment 1 - Technical Specification Bases Change to LCO 3.1.7 Clarification of Standby Liquid Control System Operability Requirements
Attachment 2 - Technical Specification Bases Mark-Ups

copy: NRC Region I
Mr. S. L. Hansell, NRC Sr. Resident Inspector
Mr. T. G. Colburn, NRC Sr. Project Manager
Mr. R. Janati, DEP/BRP

Attachment 1 to PLA-5538

Technical Specification Bases Change to LCO 3.1.7

Clarification of Standby Liquid Control System Operability Requirements

Clarification of Standby Liquid Control System Operability Requirements

Purpose:

This Technical Specification (TS) Bases change addresses the concerns raised by the response to NRC Task Interface Agreement (TIA) agreement 2001-12, dated May 6, 2002 (Attachment 1). The TIA response concluded that PPL "must consider the ATWS rule functional requirements for assessing SLC system operability".

Description of Change:

1. One change is being made to the Background section of the LCO 3.1.7 bases. The following sentence is being replaced.

   "The SLC system satisfies the requirements of 10CFR50.62 (Ref. 1) for anticipated transient without scram."

   This sentence is being replaced with the following paragraph:

   "In response to the Anticipated Transient Without Scram (ATWS) Rule (Ref. 1), PPL chose to use two-pump operation to achieve the injection flow rate required by the rule (i.e., 82.4 gpm at an equivalent sodium pentaborate concentration of 13.6 weight %). Since the incremental change in risk that could have been achieved from modifying the SLC LCO to include pump operability is very small, the pump operability requirements in the SLC LCO do not include ATWS event considerations (Ref. 4). As a result, the subsystem operability requirements are based on the original SLC design. The SLC subsystem operability requirements are not based on the ATWS rule. "

   The minimum concentration for ATWS rule compliance (13.6 weight %) is included for consistency with the commitment made in Reference 5."

2. Two references are added that support the Background text.

These changes are being made to clarify the basis for the SLC LCO 3.1.7. These changes are considered editorial changes since they do not affect how the LCO requirements have been or will be implemented. Only the Background section and references section of the bases are affected. Those sections of the TS bases such as the LCO, ACTIONS and SURVEILLANCE REQUIREMENTS that provide implementation guidance are not affected. The intent of the TS requirement is not affected by this change.

Background:

Issue Identification:

During NRC Inspection 2001-004, NRC identified a concern (documented as an unresolved item number URI 05000387; 05000388/2001-004-03) with how PPL addresses the ATWS requirements in the design and licensing basis of SSES Units 1 and 2. As a result, NRC Region I issued a TIA dated 8/30/01 to NRR to request technical assistance. PPL issued a Condition Report that identified the need for a corrective action on 11/10/01 to clarify the LCO TS 3.1.7 bases. NRR provided a response to the TIA on May 6, 2002.

Standby Liquid Control System Design Evolution:

The Standby Liquid Control System (SLCS) is an independent, diverse backup system to the Control Rod Drive (CRD) System. The function of the SLCS is to inject a neutron absorbing solution into the RPV to achieve and maintain sub-criticality in the event that control rods cannot be manually inserted. Sufficient solution is injected such that the RPV will be brought from maximum rated power conditions to cold sub-critical over the entire RPV temperature range from maximum operating to cold shutdown conditions. There is no requirement for the SLCS to be capable of operation when the RPV is shutdown by the CRD System.

The SLCS was originally classified by General Electric Company (GE) as a "Special Capability System" (a subset of the non-safety-related classification), designed with the ability to shutdown the RPV and bring the RPV to the cold shutdown condition independent of the control rods. Because the SLCS is not required to respond and mitigate the consequences of a DBA, the SLCS is not required to meet all safety design basis requirements of Engineered Safety Feature Systems. However, in order for the system to have a high degree of reliability, the system was designed with many safety-related system features (e.g., components required for injection are designed to safety-related criteria).

The SLCS was provided with redundant pumps and explosive valves, with each pump capable of providing 100 percent of the flow required to bring the RPV to cold shutdown conditions. To fulfill this need, one pump with a flowrate of 41.2 gpm at a pump discharge pressure of 1190 psig was originally required.[1] This TS limit was not changed

[1] The original discharge pressure was based upon a lowest SRV relief setpoint of 1106 psig. This SRV setpoint was later lowered to 1076 psig, which resulted in a required discharge pressure of 1150 psig; however, the requirement for a discharge pressure of 1190 psig was retained since it was conservative. The discharge pressure required by SSES TS has never accounted for the ATWS event.

when the ATWS rule was implemented. This TS limit was later changed to 1224 psig when Power Uprate was implemented. The value of 1224 psig was based upon a 30 psi increase in the SRV setpoint, and a 4 psig correction for increased core dp.

ATWS Rule Compliance

In response to the ATWS Rule (10 CFR50.62), PPL chose to use two-pump operation to achieve the injection flow rate required by the rule (i.e., 82.4 gpm at an equivalent sodium pentaborate concentration of 13.6 weight %). In implementing this change, PPL committed to follow the guidance provided in GE's NEDE-31096-P, "Licensing Topical Report: Anticipated Transients without SCRAM Response to NRC ATWS Rule, 10 CFR 50.62". PPL did not make any TS changes to implement the ATWS rule.

Relevant aspects (to the SLC system) of the docketed correspondence relative to PPL compliance to the ATWS rule and the SLC system are as follows:

8/19/85 – Denton (NRC) to Fulton (BWROG)

- This letter describes that TS's (that are based on single pump operation) are not required to be changed if two pumps are required to meet the ATWS rule. The basis provided is that (1) the SLC system is a backup to a highly reliable safety system, (2) additional levels of defense are provided by backup scram valves and ARI system and (3) the incremental change in risk which would derive from changing the LCO is very small.

12/85 – NEDE-31096-P "Response to NRC ATWS Rule, 10 CFR 50.62

- Existing SLCS TS are based on the original SLCS design. The ATWS rule provides additional requirements. Since the ATWS function of SLCS is a backup to other safety-related systems, new TS requirements are not needed as agreed to by NRC in the Denton (NRC) to Fulton (BWROG) letter of 8/19/85. No change to the LCO is required.

10/21/86 - Safety Evaluation Of Topical Report (NEDE-31096-P) "Anticipated Transient Without Scram; Response To ATWS Rule 10 CFR 50.62"

- Approved conceptual designs for compliance with the ATWS rule. Indicated that TS's would require plant specific submittals.

4/6/87 – PLA-2833

- PPL indicates endorsement of NEDE-31096-A and indicates that PPL will implement design changes to make the SLC system two pump systems in accordance with the NEDE.

- PPL indicates that 41.2 gpm per pump with a minimum of 13.6 weight percent concentration of sodium pentaborate is required to meet 10 CFR 50.62.

7/20/87 – PLA-2890

- RAI responses. PPL commits to performing a two-pump test to verify NPSH and vibration are not problems with the two-pump configuration.

10/18/88 – Letter from Mohan C. Thadani (NRC) to Harold W. Keiser (PPL) "Safety Evaluation Related to Compliance with ATWS Rule 10CFR50.62 (TAC NOS. 59149/59150) dated October 18, 1988.

- NRC indicates that PPL's compliance to the ATWS rule is acceptable based on PLA-2833 and FSAR Rev 39 assuming sodium pentaborate concentration TS changes are subsequently proposed. NRC indicates that the SLC system incorporates two-pump operation in accordance with the requirements of 10CFR50.62 paragraph (C)(4).

- NRC indicates that PPL performed a "...a dual pump operation test" and that "Periodic single pump test will continue to be performed in accordance with existing specifications."

3/20/89 – PLA-3171

- This letter provided PPL's response to the 10/18/88 NRC SER described above. PPL indicates in this letter that TS changes are not necessary or required to comply with 10 CFR 50.62. This letter further identifies that the existing Technical Specifications provide an adequate level of protection to public health and safety. Plant procedures were revised to include a requirement that limits the concentration to 13.6 weight percent.

TS Conversion to ITS Format:

SSES TS's were changed in 1998 to include the relevant sodium pentaborate concentration requirements during the ITS conversion. This was done to reflect existing plant procedures. Specific reference was provided in the sodium concentration SR TS Bases description, the applicable ACTION "A", and Safety Analysis section of the TS's. These changes to the standard NUREG 1433 wording were justified by Deviation P.3. This deviation indicates that the deviation from the standard was needed to account for the SSES design and the wording added to the TS Bases was needed to accurately identify that the sodium pentaborate concentration limit of 13.6 weight percent was based on ATWS event requirements.

Justification for the TS Bases Change

1. Based on licensing agreements during the time the ATWS rule was being implemented at SSES, ATWS rule SLC subsystem functional requirements were not required to be addressed in the SSES SLC system TS's. PPL did not include ATWS subsystem functional requirements into the SSES SLC system TS.

2. SSES TS requirements for sodium pentaborate concentration are in part based on the ATWS rule. In converting to the ITS format, PPL chose to base the TS limit for "mitigation" on the minimum acceptable value needed for compliance with the ATWS rule to maintain consistency with existing plant procedures.

3. SLCS subsystem functional requirements pursuant to the ATWS event are not addressed by SSES TS's at the time of ATWS rule implementation because (1) the SLC system is a backup to a highly reliable safety system, (2) additional levels of defense are provided by backup scram valves and the ARI system and (3) the incremental change in risk which would derive from changing the TS is very small. With this as the basis, exclusion of SLCS subsystem surveillance's for conformance to ATWS functional requirements in the TS's was determined appropriate by the NRC and BWROG.

These conclusions remain valid.

Based on the above, the SSES TS's do not need to consider the ATWS rule functional requirements for assessing SLC subsystem operability.

Attachment 2 to PLA-5538

Technical Specification LCO 3.1.7
Bases Mark-Ups

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.7 Standby Liquid Control (SLC) System

BASES

BACKGROUND

The SLC System is designed to provide the capability of bringing the reactor, at any time in a fuel cycle, from full power and minimum control rod inventory to a subcritical condition with the reactor in the most reactive, xenon free state without taking credit for control rod movement. ~~The SLC system satisfies the requirements of 10 CFR 50.62 (Ref. 1) for anticipated transient without scram.~~

The SLC System consists of a sodium pentaborate solution storage tank, two positive displacement pumps, two explosive valves that are provided in parallel for redundancy, and associated piping and valves used to transfer borated water from the storage tank to the reactor pressure vessel (RPV). The borated solution is discharged near the bottom of the core shroud, where it then mixes with the cooling water rising through the core. A smaller tank containing demineralized water is provided for testing purposes.

INSERT 1

APPLICABLE SAFETY ANALYSES

The SLC System is manually initiated from the main control room, as directed by the emergency operating procedures, if the operator believes the reactor cannot be shut down, or kept shut down, with the control rods. The SLC System is used in the event that enough control rods cannot be inserted to accomplish shutdown and cooldown in the normal manner. The SLC System injects borated water into the reactor core to add negative reactivity to compensate for all of the various reactivity effects that could occur during plant operations. To meet this objective, it is necessary to inject a quantity of boron, which produces a concentration of 660 ppm of natural boron, in the reactor coolant at 68°F. To allow for potential leakage and imperfect mixing in the reactor system, an amount of boron equal to 25% of the amount cited above is added (Ref. 2). The volume versus concentration limits in Figure 3.1.7-1 and the temperature versus concentration limits in Figure 3.1.7-2 are calculated such that the required concentration is achieved accounting for dilution in the RPV with normal water level and including the water volume in

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.7.8 and SR 3.1.7.9 (continued)

pumps is unblocked ensures that there is a functioning flow path for injecting the sodium pentaborate solution. An acceptable method for verifying that the suction piping is unblocked is to pump from the storage tank to the test tank. This test can be performed by any series of overlapping or total flow path test so that the entire flow path is included. The 24 month Frequency is acceptable since there is a low probability that the subject piping will be blocked due to precipitation of the boron from solution in the heat traced piping. This is especially true in light of the temperature verification of this piping required by SR 3.1.7.3. However, if, in performing SR 3.1.7.3, it is determined that the temperature of this piping has fallen below the specified minimum or the heat trace was not properly energized and building temperature was below the temperature at which the SLC solution would precipitate out, SR 3.1.7.9 must be performed once within 24 hours after the piping temperature is restored to within the limits of Figure 3.1.7-2.

REFERENCES

1. 10 CFR 50.62.

2. FSAR, Section 9.3.5.

3. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).

INSERT 2

LCO 3.1.7 Bases Inserts

Background:

Insert 1

In response to the Anticipated Transient Without Scram (ATWS) Rule (Ref. 1), PPL chose to use two-pump operation to achieve the injection flow rate required by the rule (i.e., 82.4 gpm at an equivalent sodium pentaborate concentration of 13.6 weight %). Since the incremental change in risk that could have been achieved from modifying the SLC LCO to include pump operability is very small, the pump operability requirements in the SLC LCO do not include ATWS event considerations (Ref. 4). As a result, the subsystem operability requirements are based on the original SLC design. The SLC subsystem operability requirements are not based on the ATWS rule.

The minimum concentration for ATWS rule compliance (13.6 weight %) is included for consistency with the commitment made in Reference 5.

References:

Insert 2

4. Letter from Harold R. Denton (NRC) to John M. Fulton (BWROG) dated August 19, 1985.

5. PLA-2833, "ATWS RULE – PROOF OF ADEQUACY" dated April 6, 1987.