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MAY 11 2004

U.S. Nuclear Regulatory Commission
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Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED AMENDMENT NO. 264 TO LICENSE NFP-14
AND PROPOSED AMENDMENT NO. 229 TO LICENSE NFP-22:
RESOLUTION OF URI 2001-04-03
STANDBY LIQUID CONTROL /ATWS **Docket Nos. 50-387**
PLA-5739 **and 50-388**

References: 1) *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), dated May 6, 2002.*

Pursuant to 10 CFR 50.90, PPL Susquehanna, LLC (PPL), proposes to amend the Susquehanna Steam Electric Station Units 1 and 2 (SSES) Technical Specifications (TS). The proposed change would revise the Standby Liquid Control (SLC) pump discharge pressure surveillance (SR 3.1.7.7) acceptance criteria from 1224 psig to 1395 psig in the SSES TS 3.1.7, "Standby Liquid Control (SLC) System."

This change to the SLC pump discharge pressure surveillance is necessary to resolve the conclusion in NRR's response to the Task Interface Agreement – TIA 2001-12 (Reference 1), that the current TS 3.1.7 requires the SLC system to be capable of meeting the Anticipated Transient Without Scram (ATWS) rule functional requirements to be considered operable.

The need for this amendment request has been discussed with the SSES NRC Project Manager.

A001

These proposed changes have been approved by the SSES Plant Operations Review Committee and reviewed by the Susquehanna Review Committee. In accordance with 10 CFR 50.91(b)(1), PPL is sending a copy of this letter to the Pennsylvania Department of Environmental Protection.

If you have any questions, please contact Mr. Duane L. Filchner at (610)774-7819.

I declare under penalty of perjury that the foregoing is true and correct.

Sincerely,

Executed on: 05/11/04

B. L. Shriver
Sr. Vice-President and Chief Nuclear Officer

Enclosure:
PPL Evaluation of the Proposed Change

Attachments:

Enclosure - PPL Evaluation of the Proposed Change
Attachment A - Proposed Technical Specification Change for Surveillance Requirement SR 3.1.7.7 (Markup)
Attachment B - Proposed Technical Specification Change for Surveillance Requirement SR 3.1.7.7 (Camera Ready)
Attachment C - Information Only- Technical Specification Bases Changes for Section 3.1.7.7
Attachment D - List of Regulatory Commitments
Attachment E - Standby Liquid Control System Licensing Basis and Design Evolution

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

Enclosure to PLA – 5739

PPL Evaluation of the Proposed Change

PPL EVALUATION

1.0 DESCRIPTION

This is a request to amend Operating Licenses NPF-14 and NPF-22 for PPL Susquehanna, LLC (PPL), Susquehanna Steam Electric Station (SSES) Units 1 and 2. It represents a proposed revision to the SSES Technical Specification (TS) 3.1.7, "Standby Liquid Control (SLC) System" which changes the SLC pump discharge pressure currently specified in Surveillance Requirement (SR) 3.1.7.7.

2.0 PROPOSED CHANGE

PPL proposes a change to the SLC pump discharge pressure specified in the Susquehanna TS SR 3.1.7.7 to the following:

> ***Verify each pump develops a flow rate ≥41.2 gpm at a discharge pressure ≥1395 psig.***

This change in pump discharge pressure establishes the functional requirements for assessing SLC pump operability under ATWS conditions in the SSES TS's.

The SSES TS Bases Section SR 3.1.7.7 is also revised to reflect the new SLC pump discharge pressure and to provide clarification regarding compliance with the ATWS Rule 10 CFR 50.62.

3.0 BACKGROUND

Issue Identification and Current Status

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 Task Interface Agreement (TIA) 2001-12 on 8/30/01 to NRR to request technical assistance to evaluate the concern. NRR provided a response to the TIA on May 6, 2002 (Reference 1).

The response from NRR concluded that PPL must consider:

1. The ATWS rule functional requirements as part of the SSES Standby Liquid Control (SLC) system design bases.

2. The ATWS rule functional requirements for assessing SLC system operability.

This proposed change to SSES TS SR 3.1.7.7 resolves the SLC system operability concerns raised by the NRR response to the TIA. It provides a pump discharge pressure that is based on the maximum calculated ATWS pressure (which occurs with a loss of AC power). As such, the SSES SLC system operability will be based on successful completion of SR 3.1.7.7, along with the requirement to have 2 SLC subsystems operable and sodium pentaborate concentration greater than or equal to 13.6 weight percent.

PPL responded to TIA Item 1 by clarifying in the FSAR that the ATWS rule functional requirements are part of the SSES SLC system design basis.

PPL originally responded to TIA Item 2 by proposing changes to the TS bases for Section 3.1.7, in a letter to the NRC (Reference 2, dated 11/08/2002). This bases change provided clarification of the SLC system operability requirements by stating that they are based on original SLC design, not the ATWS rule. It was later determined, by the NRC, (Reference 3) that this bases change would not resolve the NRC concern and that functional capability of the SLC system to meet the ATWS requirements was necessary to demonstrate operability.

On November 26, 2003, NRC notified PPL (Reference 3), that the changes proposed by Reference 2 were not sufficient to resolve the concern.

Examination of the TIA response identifies that:

> "Whether the SLC system capability to meet the ATWS rule requirements is a part of the SLC system's design basis, however, is not necessarily related to SLC system operability requirements. The standard technical specifications (STS), NUREG-1433, Specification 3.1.7 does not require meeting 10 CFR 50.62 functional requirements to meet LCO 3.1.7." (This appears to be a generic statement.)

However, the TIA continues by stating (specific to SSES):

> "...in its application dated August 1, 1996, to adopt the improved TSs (ITS), which were based on the STS, the SSES Units 1 and 2 licensee proposed a deviation from STS 3.1.7, in that it modified STS LCO 3.1.7 Condition A, associated SR, and Bases to establish requirements for meeting 10 CFR 50.62 into the [SSES Units 1 and 2] ITS."

Therefore, the NRC has concluded (in the TIA response) that:

> "...the Susquehanna current TS do require the capability to meet the ATWS rule functional requirements; that is meeting ATWS rule functional requirements is one of the SLC system's "specified safety functions," for current TS 3.1.7.

To resolve this Susquehanna specific issue, the SSES Units 1 and 2 TS SR 3.1.7.7 are proposed to be changed such that SLC system operability will be based on the operability of 2 SLC subsystems (current requirement), the concentration of sodium pentaborate (current requirement), and the capability of the SLC pumps to deliver sodium pentaborate at a 41.2 gpm flowrate at a discharge pressure of 1395 psig (the discharge pressure value is the new proposed requirement), which corresponds to the maximum calculated ATWS pressure.

Conclusion:

Licensing agreements (discussed in Attachment E) made during the time the ATWS rule was being implemented at SSES did not require ATWS rule SLC functional requirements to be addressed in the SSES SLC system TS's. These functional requirements were not addressed at the time of 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 resulting from a change to the TS is very small.

Although SSES has been in compliance with the ATWS rule requirements, it is recognized that a conflict exists between the historical licensing basis and the NRR response to the TIA. Accordingly, this conflict is resolved by the proposed revision to the SLC TS Surveillance 3.1.7.7. This change has no impact on any aspect of current plant operation.

4.0 TECHNICAL ANALYSIS

4.1 Basis for the Proposed Change:

The proposed change in SLC pump discharge pressure from 1224 psig to 1395 psig is derived from: an RPV Dome Pressure of 1195 psig, which corresponds to the lowest main steam safety relief valve spring setpoint; an RPV Static head of 8 psig; a Core Delta-P of 6 psid; and two pump SLC System friction losses of 186 psig.

The SLC system friction losses were determined by a test that measured actual system line losses during two pump operation (82.4 gpm). The SSES worst case ATWS Analysis assumes two pump operation, therefore it is appropriate to use these friction losses to calculate the maximum injection pressure required for compliance with the ATWS Rule (10 CFR 50.62). Since these friction losses are used to establish the discharge pressure requirements and they are greater than they would be for one pump operation, they are acceptable and conservative to establish the 1395 psig test pressure in the surveillance.

4.2 Acceptability of the Change:

This change to SR 3.1.7.7 only impacts the current plant surveillance procedure by making the acceptance criteria for the SR the same as the current In Service Testing (IST) program acceptance criteria. Although the present TS value for acceptable pump discharge pressure is $\geq$ 1224 psig, the acceptance criteria (for TS Section 5.5.6 IST program requirements) in the quarterly SLC flow surveillance is $\geq$ 1395 psig. Therefore, the pumps are already being tested to demonstrate capability of producing the required flow (41.2 gpm each) at a pump discharge pressure representing maximum ATWS pressure conditions, i.e. 1395 psig.

Modifications to the SLC system were implemented to compensate for this higher pressure. The modifications, which were intended to preserve margin, increased the SLC pump discharge piping design pressure and pump discharge PSV setpoint to 1500 psi. Thus, a 105 psi margin exists between the maximum required pump discharge pressure and the PSV setpoint. This 105 psi margin is greater than the original GE design requirement of 75 psig.

A review of the 2003 and 2004 Quarterly Surveillance test data for both Units 1 and 2 identified that the pumps met the acceptance criteria for discharge pressure > 1395 psig and flow > 41.2 gpm in all surveillances performed.

4.3 Impact of the Change on Plant Operations:

This proposed change to SR 3.1.7.7 does not have any affect on current plant operations. As stated above, the IST program test requires each SLC pump to demonstrate capability to develop pressure sufficient to meet the injection requirements for ATWS. However, if the pump discharge pressure does not meet the new SR limit of 1395 psig, the pump would be declared inoperable and a 7 day LCO Action would be entered to correct the condition.

No special communication or training is required for Operations to implement this TS change.

4.4 Impact of the Change on Work Management:

This proposed change to SR 3.1.7.7 does not have any affect on the performance of any work or testing on the SLC system. TS 3.1.7 LCO Conditions, Required Actions, and Completion Times are unaffected by this change. Previous concerns about SLC component ratings and relief valve settings at ATWS pressures have been resolved through completed modifications, therefore, the SLC system is capable of injecting boron into the RPV during an ATWS event. These changes do not create the need to revise any current work plans or the management of any other work on the SLC system.

4.5 Acceptability of One Pump to Determine Operability:

The LCO statement for the SLC system requires two pumps to be operable, yet two pumps are not required to be tested together to demonstrate operability. Under the current SR 3.1.7.7, each pump is tested individually and determined to be operable provided it produces 41.2 gpm at pump discharge pressure $\geq$ 1224 psig. Under the proposed TS change, each pump would be tested individually (as it currently is tested) and SLC system operability would be based on meeting 41.2 gpm at pump discharge pressure $\geq$ 1395 psig.

The acceptability of testing only one pump at a time is based on the following:

- The pumps are of the piston positive displacement design, which provides a constant flowrate. During the test the discharge test line is throttled to provide the backpressure expected during two pump operation. Although only one pump is tested at a time, the test conditions adequately simulate two pump operation.

- The practice of testing one pump at a time is inherently accepted in NUREG-1433 (Improved Tech Specs), since the current SLC flow SR specifies only a single pump flow rate.

Based on a review of other BWR Tech Specs, functional capability of the SLC system is determined by demonstrating single pump operation at a specified flow rate and pump discharge pressure. Grand Gulf 1 made a TS change in 1987 that included increasing the SLC pump discharge pressure for surveillance tests in order to demonstrate adequate SLC pump flow under ATWS conditions. By using the Grand Gulf 1 submittal as a precedent, this revision to SR 3.1.7.7 provides the assurance that the SLC system is capable of meeting the ATWS rule requirements.

4.6 Acceptability of the 7 day LCO for One Pump Inoperable

Susquehanna TS 3.1.7 has a 7 day Completion Time specified for the Condition of one SLC pump inoperable. No change is proposed to this completion time. This is consistent with other BWR TS reviewed as discussed above.

5.0 REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration

The Commission has provided standards in 10 CFR 50.92(c) for determining whether a significant hazards consideration exists. A proposed amendment to an operating license for a facility involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated; (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

PPL proposes to revise the Susquehanna Unit 1 and Unit 2 Technical Specification SR 3.1.7.7 for Limiting Condition of Operation (LCO) 3.1.7. These changes are based on 10 CFR 50.62 (ATWS Rule) requirements which are more stringent than the current Standby Liquid Control System (SLCS) Technical Specification operability requirements.

In accordance with the criteria set forth in 10 CFR 50.92, PPL has evaluated the proposed TS change and determined it does not represent a significant hazards consideration. The following is provided in support of this conclusion.

1. **Does the proposed change involve a significant increase in the probability of occurrence or consequences of an accident previously evaluated?**

   No. The proposed change establishes the operability requirements for the SLC subsystem based on its functional capability to operate during an ATWS event. This proposed change to the surveillance for SLC pump discharge pressure does not affect the operation of any other SSES SSC's. The SLC system is already being tested on a quarterly basis to the proposed new pump discharge pressure to demonstrate that the In Service Inspection Program requirements are met.

Consequently, the proposed change has no effect on the probability of any accident previously evaluated. Further, the consequences of any accident previously evaluated are not affected. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. **Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?**

No. The proposed change to the surveillance for SLC pump discharge pressure does not involve any physical alteration of the plant (no new or different type of equipment is installed) or changes in methods governing normal plant operation. Since this change does not introduce any new accident initiators, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. **Does the proposed change involve a significant reduction in a margin of safety?**

No. The proposed change to the surveillance for SLC pump discharge pressure does not involve any physical alteration of the plant (no new or different type of equipment is installed) or changes in methods governing normal plant operation. The proposed change only affects determination of SLC system Technical Specification operability based on the functional capability of the SLC subsytems to inject boron during an ATWS event. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

5.2 Applicable Regulatory Requirements/Criteria

The proposed revision to Technical Specification (TS) Surveillance Requirement (SR) 3.1.7.7 is in accordance with the requirements of 10 CFR 50.62. Revising the pump discharge pressure in the SLC system Surveillance SR 3.1.7.7 provides additional assurance that this system (which is a backup to other safety – related systems) is capable of safely shutting down the reactor should an ATWS event occur.

6.0 ENVIRONMENTAL CONSIDERATIONS

10 CFR 51.22(c)(9) identifies certain licensing and regulatory actions, which are eligible for categorical exclusion from the requirement to perform an environmental assessment. A proposed amendment to an operating license for a facility does not require an environmental

assessment if operation of the facility in accordance with the proposed amendment would not (1) involve a significant hazards consideration; (2) result in a significant change in the types or significant increase in the amounts of any effluents that may be released offsite; or (3) result in a significant increase in individual or cumulative occupational radiation exposure. PPL has evaluated the proposed change and has determined that the proposed change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Accordingly, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with issuance of the amendment. This determination, using the above criteria, is:

1. As demonstrated in the No Significant Hazards Consideration Evaluation, the proposed amendment does not involve a significant hazards consideration.

2. There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite. The proposed change does not involve any physical alteration of the plant (no new or different type of equipment will be installed) or change in methods governing normal plant operation.

7.0 REFERENCES

1. 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)

2. PLA-5538, R. L. Anderson (PPL) to USNRC, "Susquehanna Steam Electric Station Proposed Change to the SSES Unit 1 and Unit 2 Technical Specification Bases LCO 3.1.7," dated November 8, 2002.

3. Letter, R. V. Guzman (USNRC) to B. L. Shriver (PPL), "Susquehanna Steam Electric Station, Units 1 and 2 – Changes to Technical Specification Bases Pages (TAC NOS. MB6748 and MB6749)," dated November 26, 2003.

Attachment A to PLA-5739

Proposed Technical Specification Changes

(Markups)

Surveillance Requirement (SR) 3.1.7.7

(Units 1 & 2)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.1.7.6	Verify each SLC subsystem manual and power operated valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position, or can be aligned to the correct position.	31 days
SR 3.1.7.7	Verify each pump develops a flow rate ≥ 41.2 gpm at a discharge pressure ≥ ~~1224~~ 1395 psig.	In accordance with the Inservice Testing Program
SR 3.1.7.8	Verify flow through one SLC subsystem pump into reactor pressure vessel.	24 months on a STAGGERED TEST BASIS
SR 3.1.7.9	Verify all heat traced piping between storage tank and pump suction is unblocked.	24 months AND Once within 24 hours after solution temperature is restored within the limits of Figure 3.1.7-2

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.7.6	Verify each SLC subsystem manual and power operated valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position, or can be aligned to the correct position.	31 days
SR 3.1.7.7	Verify each pump develops a flow rate ≥ 41.2 gpm at a discharge pressure ≥ ~~1224~~ 1395 psig.	In accordance with the Inservice Testing Program
SR 3.1.7.8	Verify flow through one SLC subsystem pump into reactor pressure vessel.	24 months on a STAGGERED TEST BASIS
SR 3.1.7.9	Verify all heat traced piping between storage tank and pump suction is unblocked.	24 months AND Once within 24 hours after solution temperature is restored within the limits of Figure 3.1.7-2

Attachment B to PLA-5739

Proposed Technical Specification Changes

(Camera Ready)

Surveillance Requirement (SR) 3.1.7.7

(Units 1 & 2)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.7.6	Verify each SLC subsystem manual and power operated valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position, or can be aligned to the correct position.	31 days
SR 3.1.7.7	Verify each pump develops a flow rate ≥41.2 gpm at a discharge pressure ≥1395 psig.	In accordance with the Inservice Testing Program
SR 3.1.7.8	Verify flow through one SLC subsystem pump into reactor pressure vessel.	24 months on a STAGGERED TEST BASIS
SR 3.1.7.9	Verify all heat traced piping between storage tank and pump suction is unblocked.	24 months AND Once within 24 hours after solution temperature is restored within the limits of Figure 3.1.7-2

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.7.6	Verify each SLC subsystem manual and power operated valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position, or can be aligned to the correct position.	31 days
SR 3.1.7.7	Verify each pump develops a flow rate ≥ 41.2 gpm at a discharge pressure ≥ 1395 psig.	In accordance with the Inservice Testing Program
SR 3.1.7.8	Verify flow through one SLC subsystem pump into reactor pressure vessel.	24 months on a STAGGERED TEST BASIS
SR 3.1.7.9	Verify all heat traced piping between storage tank and pump suction is unblocked.	24 months AND Once within 24 hours after solution temperature is restored within the limits of Figure 3.1.7-2

Attachment C to PLA-5739

Information Only

Proposed Technical Specification Bases Changes

(Markups)

Surveillance Requirement (SR) 3.1.7.7

(Units 1 & 2)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.1.7.7

Demonstrating that each SLC System pump develops a flow rate ≥ 41.2 gpm at a discharge pressure ≥ 1224 psig ensures that pump performance has not degraded during the fuel cycle. This minimum pump flow rate requirement ensures that, when combined with the sodium pentaborate solution concentration requirements, the rate of negative reactivity insertion from the SLC System will adequately compensate for the positive reactivity effects encountered during power reduction, cooldown of the moderator, and xenon decay. This test confirms one point on the pump design curve and is indicative of overall performance. Such inservice inspections confirm component OPERABILITY, trend performance, and detect incipient failures by indicating abnormal performance. The Frequency of this Surveillance is in accordance with the Inservice Testing Program.

1395

without actuating the pump's relief valve

Testing at 1395 psig assures that the functional capability of the SLC system meets the ATWS Rule (10CFR50.62) (Ref 1.) requirements

SR 3.1.7.8 and SR 3.1.7.9

These Surveillances ensure that there is a functioning flow path from the boron solution storage tank to the RPV, including the firing of an explosive valve. The replacement charge for the explosive valve shall be from the same manufactured batch as the one fired or from another batch that has been certified by having one of that batch successfully fired. The pump and explosive valve tested should be alternated such that both complete flow paths are tested every 48 months at alternating 24 month intervals. The Surveillance may be performed in separate steps to prevent injecting solution into the RPV. An acceptable method for verifying flow from the pump to the RPV is to pump demineralized water from a test tank through one SLC subsystem and into the RPV. The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed at the 24 month Frequency; therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

Demonstrating that all heat traced piping between the boron solution storage tank and the suction inlet to the injection

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.1.7.7

Demonstrating that each SLC System pump develops a flow rate ≥ 41.2 gpm at a discharge pressure ≥ ~~1224~~ 1395 psig without actuating the pump's relief valve ensures that pump performance has not degraded during the fuel cycle. This minimum pump flow rate requirement ensures that, when combined with the sodium pentaborate solution concentration requirements, the rate of negative reactivity insertion from the SLC System will adequately compensate for the positive reactivity effects encountered during power reduction, cooldown of the moderator, and xenon decay. This test confirms one point on the pump design curve and is indicative of overall performance. Such inservice inspections confirm component OPERABILITY, trend performance, and detect incipient failures by indicating abnormal performance. The Frequency of this Surveillance is in accordance with the Inservice Testing Program.

Testing at 1395 psig assures that the functional capability of the SLC system meets the ATWS Rule (10CFR 50.62) (Ref 1.) requirements.

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These Surveillances ensure that there is a functioning flow path from the boron solution storage tank to the RPV, including the firing of an explosive valve. The replacement charge for the explosive valve shall be from the same manufactured batch as the one fired or from another batch that has been certified by having one of that batch successfully fired. The pump and explosive valve tested should be alternated such that both complete flow paths are tested every 48 months at alternating 24 month intervals. The Surveillance may be performed in separate steps to prevent injecting solution into the RPV. An acceptable method for verifying flow from the pump to the RPV is to pump demineralized water from a test tank through one SLC subsystem and into the RPV. The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed at the 24 month Frequency; therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

Demonstrating that all heat traced piping between the boron solution storage tank and the suction inlet to the injection

(continued)

Attachment D to PLA-5739

List of Regulatory Commitments

(Units 1 & 2)

LIST OF REGULATORY COMMITMENTS

REGULATORY COMMITMENTS	Due Date/Event
None Identified.	N/A

Attachment E to PLA-5739

Standby Liquid Control System Licensing Basis and Design Evolution (Units 1 & 2)

Standby Liquid Control System Licensing Basis and 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 Reactor Pressure Vessel (RPV) to achieve and maintain sub-criticality in the event that control rods cannot be manually inserted. Sufficient solution is injected such that the reactor 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 reactor 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 reactor and bring it 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 SLC system was provided with redundant pumps and isolation valves, with each pump capable of providing 100 percent of the flow required to bring the RPV from maximum rated power 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. This TS limit was not changed when the ATWS Rule (10 CFR 50.62) 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 original SRV setpoint, and a 4 psig correction for increased core dp.

ATWS Rule (10 CFR 50.62) Compliance

In response to the ATWS Rule, 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 %). To implement 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."

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

August 19, 1985 – Denton (NRC) to Fulton (BWROG)

- This letter describes that TS (changes for TS based on single pump operation) are not required 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 Alternate Rod Insertion (ARI) system and (3) the incremental change in risk which would derive from changing the LCO is very small.

December 1985 – NEDE-31096-P "Response to NRC ATWS Rule, 10 CFR 50.62"

- The existing SLC System TS are based on the original SLC System design. The ATWS rule provides additional requirements, however, since the ATWS function of SLC is a backup to other safety-related systems, new TS requirements are not needed. This position was agreed to by NRC in the Denton (NRC) to Fulton (BWROG) letter of August 19, 1985. No change to the LCO was required.

October 21, 1986 - Safety Evaluation Of Topical Report (NEDE-31096-P) Anticipated Transient Without Scram; Response To ATWS Rule 10 CFR 50.62"

- The NRC approved conceptual designs for compliance with the ATWS rule. The SER indicated that TS's would require plant specific submittals.

April 6, 1987 – PLA-2833

- This PPL letter to NRC indicates endorsement of NEDE-31096-A. It states that PPL will implement design changes to make the SLC system a two pump system in accordance with the NEDE.

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

July 20, 1987 – PLA-2890

- This PPL letter to NRC is a response to a Request for Additional Information (RAI). PPL committed to performing a two-pump test to verify that NPSH and vibration are not problems with the two-pump configuration.

October 18, 1988 – 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).

- This SER by the NRC indicated 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 10 CFR 50.62 paragraph (C)(4).

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

March 20, 1989 – PLA-3171

- This PPL letter to NRC provided PPL's response to the October 18, 1988 NRC SER (described above). PPL indicated in this letter 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 3.1.7 for Units 1 and 2 was 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. The ITS conversion did not propose to deviate from the original TS regarding the prescribed pump discharge pressure.