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SUBJECT: Submits proposed rev which changes total allowed secondary containment bypass leakage from 5 scfh to 9 scfh, based on revised offsite dose analysis.

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SUSQUEHANNA STEAM ELECTRIC STATION  
REVISION TO PROPOSED AMENDMENT NO. 203  
TO LICENSE NPF-14 AND NO. 161 TO LICENSE NPF-22:  
TECHNICAL SPECIFICATION CHANGES FOR  
SECONDARY CONTAINMENT BYPASS LEAKAGE (5 TO 9 SCFH)  
PLA-4567 FILES A17-2/R41-2

Docket Nos. 50-387  
and 50-388

- References:
- 1) PLA-4488, "Proposed Amendment No. 203 to License NPF-14 and No. 161 to License NPF-22: Conversion of the SSES Technical Specifications to the ISTS, NUREG-1433," August 1, 1996.
  - 2) PLA-4500, "Application of Standard Review Plan 6.5.5 Provisions - Secondary Containment Bypass Leakage Criteria," September 12, 1996.

The purpose of this letter is to submit a revision to the changes proposed to the Susquehanna Steam Electric Station Units 1 and 2 Technical Specifications that are related to conversion to the Improved Technical Specifications (ITS) (Reference 1). The proposed revision changes the total allowed secondary containment bypass leakage (SCBL) from 5 scfh to 9 scfh, based on a revised offsite dose analysis. The new analysis incorporates changes to the assumptions for suppression pool scrubbing of the leakage flows. The suppression pool scrubbing assumption was recently used by PP&L and presented to the NRC in Reference 2. The revised offsite doses remain less than offsite doses previously approved by the NRC for Susquehanna Steam Electric Station (SSES).

The change to secondary containment bypass leakage is being made due to the newly identified leakage pathways. Based on an analysis performed by PP&L, the primary containment feedwater penetration will not be capable of sustaining a 30 day water seal during a DBA LOCA, as originally documented in the SSES FSAR. Therefore, the potential for air leakage through the large valves in this penetration during a LOCA are now considered SCBL. In addition, PP&L has performed a thorough review of all the primary containment penetrations and identified other potential leakage pathways. Even though PP&L plans to maintain the same maintenance standards for each valve, an increase in the allowed SCBL limit is necessary to accommodate the new pathways identified. If these new pathways are required to meet the old SCBL requirement of 5 scfh, more frequent valve maintenance would likely be required which would result in increased dose to plant personnel.

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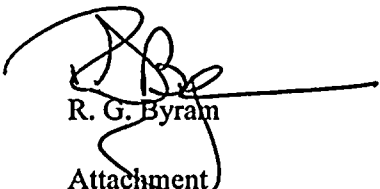
Since the SCBL requirement is not contained in the current Technical Specifications and since a value of 9 scfh results in no increase in the calculated offsite dose consequences, PP&L has changed the SCBL requirements to 9 scfh through the 10 CFR 50.59 process. This 10 CFR 50.92 submittal is necessary because the Improved Technical Specifications proposed a SCBL requirement of 5 scfh which needs to be changed to 9 scfh in order to preserve the current valve testing requirements. The associated ITS bases must also be changed because the previously proposed bases define the SCBL pathways but do not include the recently identified pathways. The revised general wording covers all pathways currently identified. Note that 9 scfh is still expected to be too low to permit replacement of the affected valve seals at their design useful lifetime. Therefore, PP&L plans to provide a future submittal to increase the SCBL limit based on a new offsite dose analysis with slightly increased dose consequences to allow the valve maintenance to return to a frequency that is more consistent with the maintenance frequency which was established upon initial implementation of 10 CFR 50, Appendix J, Option B.

The attached evaluation for this proposed amendment concludes that the proposed changes to the SSES Unit 1 and Unit 2 Technical Specifications do not involve a significant hazards consideration. In addition, the proposed changes do not create a potential for a significant change in the types or a significant increase in the amount of any effluent that may be released offsite, nor do the changes involve a significant increase in individual or cumulative occupational radiation exposures. Accordingly, the changes meet the eligibility criteria for a categorical exclusion as set forth in 10 CFR 51.22(c)(9). Therefore, in accordance with 10 CFR 51.22 (b), an environmental assessment of the changes is not required.

This revision to the Technical Specification amendment request was approved by the Susquehanna SES Plant Operations Review Committee and reviewed by the Susquehanna Review Committee. In accordance with 10 CFR 50.91, the State of Pennsylvania has been provided a copy of this letter.

PP&L plans to implement the proposed Technical Specification requirements at the same time the entire ITS change is implemented. Therefore, we request that NRC complete the review of this change request as part of the ITS review to support PP&L's scheduled implementation dates. Any questions regarding this proposed revision to the ITS amendment request should be directed to Mr. A. J. Roscioli at (610) 774-4019.

Very truly yours,



R. G. Byram

Attachment

copy: NRC Region I  
Mr. K. Jenison NRC Sr. Resident Inspector - SSES  
Mr. C. Poslusny, Jr. NRC Sr. Project Manager - OWFN  
Mr. W. P. Dornsife, Pa. DEP

## SAFETY ASSESSMENT

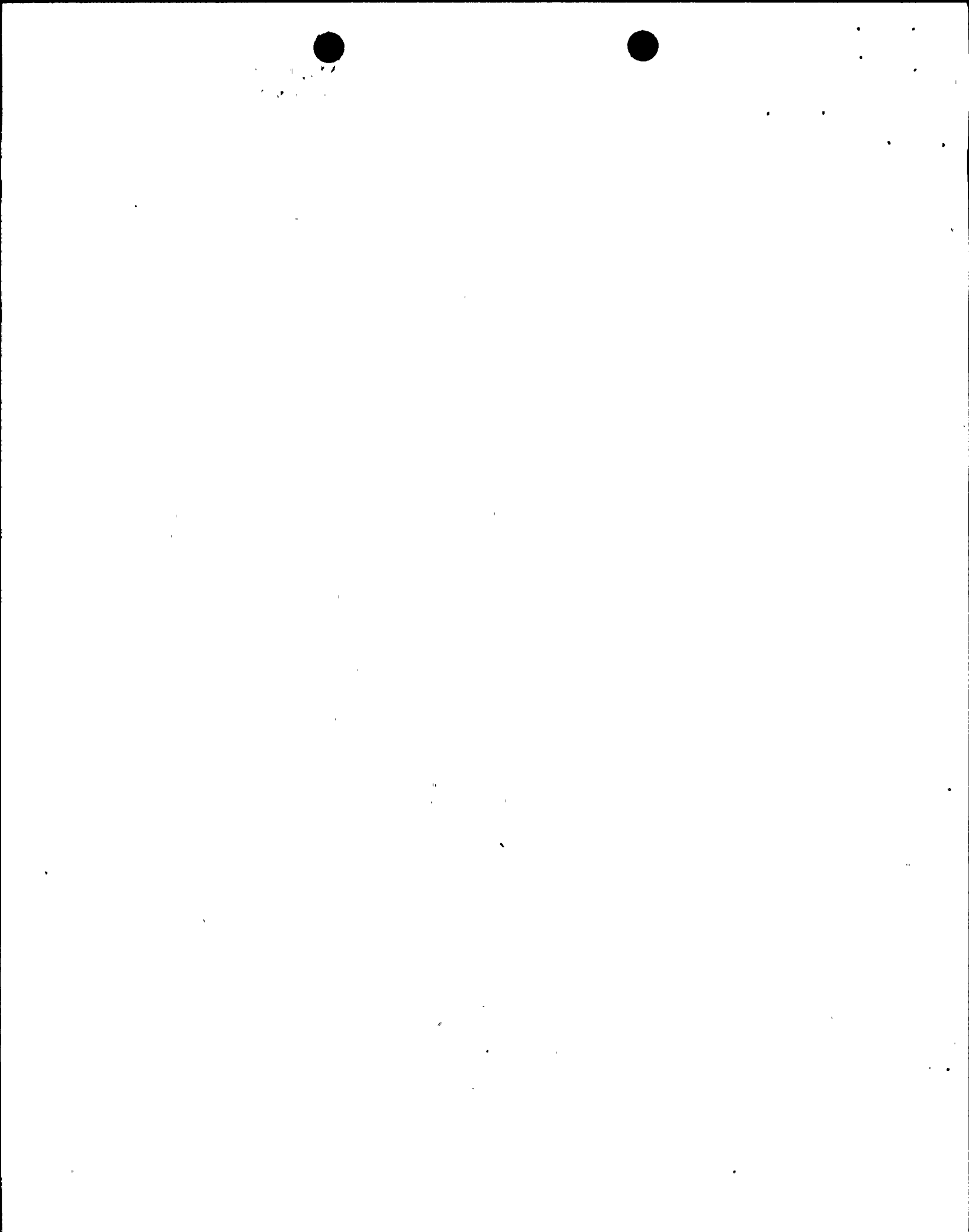
### SECONDARY CONTAINMENT BYPASS LEAKAGE INCREASE FROM 5 SCFH TO 9 SCFH

#### BACKGROUND

As documented in several Condition Reports, PP&L has identified various secondary containment bypass leakage pathways that are not discussed in the FSAR. FSAR Section 6.2.3.2.3 evaluated the potential secondary containment bypass leakage (SCBL) pathways and concluded that the Main Steam Line Drains (MSLDs) were the only leakage pathway of concern. The LOCA/LOOP offsite dose analysis was performed assuming that 5 scfh is released directly to the environment which bounds the leakage permitted for this pathway. The Susquehanna Units 1 and 2 Proposed Improved Technical Specifications require that leakage through all secondary containment bypass leakage pathways be less than 5 scfh. PP&L has performed a new offsite dose analysis using 9 scfh secondary containment bypass leakage which resulted in no increase in the calculated LOCA/LOOP offsite dose. The changes proposed in this evaluation are based on the new offsite dose analysis and provide consistency with the SCBL due to the newly identified pathways, the offsite dose analyses for the design basis LOCA/LOOP event, and the proposed Improved Technical Specification (ITS) requirements.

The change to secondary containment bypass leakage is being made due to the newly identified leakage pathways. Based on an analysis performed by PP&L, the primary containment feedwater penetration will not be capable of sustaining a 30 day water seal during a DBA LOCA, as originally documented in the SSES FSAR. Therefore, the potential for air leakage through the large valves in this penetration during a LOCA are now considered SCBL. In addition, PP&L has performed a thorough review of all the primary containment penetrations and identified other potential leakage pathways. Even though PP&L plans to maintain the same maintenance standards for each valve, an increase in the allowed SCBL limit is necessary to accommodate the new pathways identified. If these new pathways are required to meet the old SCBL requirement of 5 scfh, more frequent valve maintenance would likely be required which would result in increased dose to plant personnel.

Since the SCBL requirement is not contained in the current Technical Specifications and since a value of 9 scfh results in no increase in the calculated offsite dose consequences, PP&L has changed the SCBL requirements to 9 scfh through the 10 CFR 50.59 process. This 10 CFR 50.92 submittal is necessary because the Improved Technical Specifications proposed a SCBL requirement of 5 scfh which needs to be changed to 9 scfh in order to preserve the current valve testing requirements. Note that 9 scfh is still expected to be too low to permit replacement of the affected valves at their design useful lifetime.



## DESCRIPTION OF PROPOSED CHANGE

The revision to the Units 1 and 2 Improved Technical Specifications consists of a change to the SR 3.6.1.3.11 secondary containment bypass leakage requirement from 5 scfh to 9 scfh.

In addition, changes to Bases Section SR 3.6.1.3.11 to ensure the discussion is applicable to all currently identified secondary containment bypass leakage pathways and any new pathways that could potentially be identified in the future are required.

Refer to the attached marked-up Technical Specifications.

## SAFETY ASSESSMENT

The FSAR event of concern, as described in FSAR Chapters 6 and 15, is a design basis LOCA/LOOP resulting in the assumed core damage source term of Regulatory Guide 1.3. The DBA LOCA dose analysis contains 3 components of leakage from primary containment to determine offsite and control room accident doses. These components are: (1) gaseous leakage from primary to secondary containment which is treated by SGTS before release to the environment; (2) water leakage from primary containment piping systems to secondary containment that contains volatile iodines and is treated by SGTS (including "ESF" leakage), and (3) gaseous leakage from primary containment which bypasses secondary containment (SCBL) and is released directly to the environment without treatment by SGTS. The leak path limit evaluated in this safety assessment is SCBL which envelopes a number of individual leak paths identified within the SSES Leakage Rate Test Program.

FSAR Section 6.2.3.2.3 discusses the need to either eliminate potential bypass leakage pathways or account for the contribution of the pathway in the accident dose analysis. The FSAR further notes that the only approved methods for eliminating bypass leakage pathways are a leakage collection system that discharges to SGTS or a 30 day water seal. During the design basis large break LOCA/LOOP, where there is assumed core damage and the break occurs below the feedwater sparger elevation (i.e., recirculation suction line break concurrent with a LOOP), the condensate and condensate transfer systems would be unavailable to maintain water in the feedwater lines and/or keepfill lines until offsite power is restored and the systems can be returned to service. Also, for a break of this size, the available ECCS systems will be unable to re-flood the reactor vessel to the point where the feedwater lines will be covered by water. Small or intermediate size breaks will not result in the rapid blowdown of the feedwater line, and the ability to maintain the feedwater spargers flooded exists for these accidents. Large breaks above the feedwater spargers while resulting in some degree of blowdown of the feedwater line do not prevent the feedwater spargers themselves from being flooded, with the exception of a feedwater line break. However, as noted in the SAFER/GESTR LOCA analysis, the core is not uncovered resulting in a maximum clad temperature of 589°F which occurs at the beginning of the event and is well below the threshold for fuel damage. Since fuel damage does not occur, post-accident bypass

leakage via the feedwater lines will not result in a radiological release. Therefore, as noted above, the event that will be the focus of this safety assessment is a large break LOCA/LOOP.

The DBA accident dose analysis in FSAR Section 15.6.5.5.1.2 states that the total SCBL is assumed to be 5 scfh. BTP CSB 6-3 states that SCBL must be controlled to the values assumed in the radiological analysis. It should be noted that the original FSAR value does not appear to be based on any expected SCBL pathway leakage performance, but is purely an assumption drawn from the appropriate dose calculation. It further indicates in Section 15.6.5.5.1 that the methods, assumptions, and conditions used in the radiological analysis are in accordance with Regulatory Guide 1.3, Revision 2. Neither of these assumptions were changed by the power uprate or reload submittals. Therefore, the cumulative sum of all SCBL pathways was controlled within the accident dose analysis assumption of 5 scfh.

This safety assessment evaluates increasing the SCBL assumed value from 5 to 9 scfh (4248 sccm) without increasing the current DBA LOCA dose results. It should be noted that a value of 9 scfh is not derived based upon expected valve performance, but rather a limiting value consistent with the input assumption used in the radiological analysis. However, the increase in the value is more consistent with performance expectations placed on the large number of valves involved in the numerous pathways identified below. This value of 9 scfh is being treated as an interim measure to better match valve performance and a final value which will result in slightly increased offsite dose consequences will be pursued requiring formal approval of the NRC prior to implementation. The final value will better match the number of valves and individual performance requirements while providing acceptable dose consequences.

### COMPONENTS AFFECTED

This action affects containment isolation valves (CIVs) associated with the following containment penetrations (note that this list may be modified based on future investigations and evaluations) in terms of the leakage criteria applied to their isolation performance:

- \*\* X-9A/B      Feedwater
- X-16A/B    Core Spray
- X-17        RHR Head Spray
- \* X-23        RBCCW Supply via connection to Offgas
- X-39A/B    RHR Drywell Spray Containment Penetrations
- \* X-53        RBCW Supply to B Loop DW Coolers via connection to RBCCW

- \* X-54 RBCW Return from B loop DW coolers via connection to RBCCW
- \* X-55 RBCW Supply to A Loop DW Coolers via connection to RBCCW
- \* X-56 RBCW Return from A loop CW coolers
- \* X-61A Demineralized Water connection to DW
- \* X-85A RBCW Supply to Recirc Pp A via connection to RBCCW
- \* X-85B RBCW Return from Recirc Pp A
- \* X-86A RBCW Supply to Recirc Pp B via connection to RBCCW
- \* X-86B RBCW Return from Recirc Pp B
- \* X-88A N2 Make-up to Drywell
- \* X-220B N2 Make-up to Wetwell

\* These pathways were not originally recognized as possible SCBL and were not considered for leakage requirements within the 5 scfh limit.

\*\* Although this pathway is now included as part of the overall SCBL, it was not included at the time of the original dose calculation since a water seal was believed to exist for this line.

#### SAFETY FUNCTIONS OF AFFECTED COMPONENTS

The safety function of interest is the containment isolation function performed by piping and containment isolation valves in each of the SCBL pathways listed above. The proposed change only concerns the leak tightness of the systems and valves in terms of their cumulative contributions to Secondary Containment Bypass Leakage. Other safety functions associated with the various pathways and their associated isolation valves remain unaffected.



## POTENTIAL EFFECTS ON SAFETY FUNCTIONS

As noted above, the only accident of concern to the proposed action that is evaluated in FSAR Chapters 6 and 15 is a full reactor recirculation suction line break concurrent with a LOOP. This results in a rapid depressurization of the RPV and feedwater lines and prevents the ECCS systems from reflooding the RPV to a level that would cover the feedwater spargers with water. A LOOP event also prevents restart of various pumps to reseal various SCBL pathways with water.

The proposed change in the DBA accident dose analysis allows a change in the assumption for SCBL from the previous value of 5 scfh to a new value of 9 scfh (4248 sccm). Such a change is consistent with the guidance provided in Branch Technical Position CSB 6-3, which states that the radiological dose analysis assumption for SCBL should be established in a realistic manner considering the design limitations and test sensitivities of the equipment acting as SCBL barriers. To account for the additional contribution from the newly added pathways listed above, the SCBL assumption in the offsite dose analysis has been increased from 5 scfh to 9 scfh. This new value will then translate to individual valve performance goals when tested in their isolating condition.

The revised accident dose analysis is consistent with Standard Review Plan (SRP) Section 6.5.5 to permit utilization of the suppression pool for iodine scrubbing. While this is effective for iodine only and hence only results in significant reductions in thyroid doses, it does affect whole body doses such that a small increase in SCBL can be accommodated without increasing whole body doses.

The current SSES DBA LOCA dose calculation was revised to include the effect of suppression pool scrubbing as described in Section 6.5.5 of the Standard Review Plan (NUREG-0800). Suppression pool retention of iodine in the scrubbing process lessens the net amount of iodine available for release from primary containment to the environment, thereby reducing the radiological dose consequences of the DBA LOCA. SRP Section 6.5.5, Revision 0 permits a scrubbing decontamination factor (DF) of 10 to be applied with no requirement for independent evaluation by the NRC reviewer. Based on General Electric (GE) research (NEDO-25420) demonstrating realistic suppression pool decontamination factors of 100 to 1000 actually existing in practice, a suppression pool scrubbing DF of 10 was selected to be applied to the SSES DBA-LOCA methodology. This decontamination factor was then adjusted to account for suppression pool bypass leakage as required in SRP 6.5.5, and resulted in a net DF of 7.96. With this net scrubbing DF of 7.96 applied to the SSES DBA-LOCA methodology, the maximum containment bypass leakage flow which results in dose consequences in all categories to be below current Chapter 15.6.5 DBA-LOCA values was determined to be 9 scfh. This calculation assumes that all necessary and sufficient conditions for the application of SRP Section 6.5.5 to SSES LOCA methodology are met.

As noted above, the calculation was performed using the guidance provided in SRP Section 6.5.5. This section of the SRP identifies the acceptance criteria for crediting a plant with suppression pool scrubbing. Since this section of the SRP was issued after SSES was licensed, an evaluation of the current design against the acceptance criteria of SRP Section 6.5.5 was performed to ensure that the conditions associated with suppression pool scrubbing could be satisfied. SRP Section 6.5.5 identifies specific acceptance criteria for evaluating the use of suppression pool scrubbing in a licensee's accident dose analysis. An evaluation of the current plant design, testing, and operation against those criteria is provided in PLA-4510, "Supplemental Information: Application of Standard Review Plan Provisions," September 27, 1996. This reference establishes SSES conformance to the guidance provided in SRP Section 6.5.5, with exception of certain specific requirements contained within ANSI Standards and Reg. Guide 1.52 regarding design details, testing and instrumentation. The ANSI Standards provide specific details regarding design and testing intended to improve maintenance and testability of the systems. The failure to meet these specific requirements does not detract from the ability of these systems to perform their intended safety functions, which are the same as without scrubbing. Similarly, the addition of the instrumentation identified in Reg. Guide 1.52, while improving testability, will not aid in improving the ability of SGTS and CREOASS to perform their safety function. It should be noted that SSES was licensed with SGTS and CREOASS systems that were designed to remove iodine without the benefit of the scrubbing phenomena. Therefore, operation with essentially 8 times less iodine concentration represents a less challenging condition for these systems. Performance requirements for these systems, however, will remain unchanged. In summary, the review of the SSES design against the acceptance criteria of SRP 6.5.5 concludes that the use of suppression pool scrubbing is acceptable.

**NO SIGNIFICANT HAZARDS CONSIDERATIONS**

**SECONDARY CONTAINMENT BYPASS LEAKAGE TECHNICAL SPECIFICATION  
CHANGE AND ASSOCIATED OFFSITE DOSE ANALYSIS**

Pennsylvania Power & Light company has evaluated the proposed Technical Specification change in accordance with the criteria specified by 10 CFR 50.92 and has determined that the proposed change does not involve a significant hazards consideration. The criteria and conclusions of our evaluation are presented below.

1. **The proposed change does not involve a significant increase the probability or consequences of an accident previously evaluated.**

Of the potential accidents described in FSAR Chapters 6 and 15, only a "Decrease in Reactor Coolant Inventory as described in FSAR Section 15.6.5 is affected by the proposed action. The specific accident of concern is a design basis reactor recirculation suction line break concurrent with a LOOP which results in RPV depressurization and failure to recover RPV water level above the feedwater spargers. For this accident, the FSAR offsite dose analysis assumes a secondary containment bypass leakage rate of 5 scfh. The FSAR does not attribute this leakage to any specific pathway.

The proposed action does not increase the probability of a previously analyzed accident in any way. The condition of concern is the result of an accident and as such does not contribute to the initiation of an accident as analyzed in the FSAR.

Of concern is whether or not the proposed action significantly increases the consequences of an accident as previously evaluated. Calculations of offsite dose assuming SCBL of 9 scfh and crediting suppression pool scrubbing show decreases in thyroid and whole body doses when compared to dose calculations performed to support the NRC approved change which removes the MSIV Leakage Control System. The dose results are provided in the table below.

**Summary of Licensing Basis Dose Calculations**

|                      | Limits (rem) | Dose Calculation Results (rem) |                       |
|----------------------|--------------|--------------------------------|-----------------------|
|                      |              | 5 scfh<br>No scrubbing*        | 9 scfh<br>Scrubbing** |
| <b>Thyroid:</b>      |              |                                |                       |
| 2 hr site boundary   | 300          | 125.61                         | 41.44                 |
| 30 day LPZ           | 300          | 41.74                          | 20.59                 |
| <b>Whole Body:</b>   |              |                                |                       |
| 2 hr site boundary   | 25           | 2.22                           | 2.18                  |
| 30 day LPZ           | 25           | 0.37                           | 0.36                  |
| <b>Control Room:</b> |              |                                |                       |
| Thyroid              | 30           | 18.55                          | 8.78                  |
| Whole Body           | 5            | 0.76                           | 0.74                  |
| Skin                 | 75           | 12.17                          | 11.9                  |

- \* Results from NRC approved change for removal of the MSIV LCS (Reference: PLA-4228, November 21, 1994).
- \*\* This analysis forms the basis for a previous 10 CFR 50.59 evaluation and this proposed Technical Specification change.

These results are expected because the effect of suppression pool scrubbing is factored into the revised licensing basis analysis. Suppression pool scrubbing is effective in reducing iodine release but has no assumed effect on the removal of noble gases. Since the methodology/assumptions for scrubbing are acceptable to the NRC per the guidance in SRP Section 6.5.5 and the values for decontamination factors are conservative, the judgment may be made that considerable margin is preserved within the analysis.

Since the increase in SCBL to 9 scfh coupled with the effect of suppression pool scrubbing result in a large reduction in the thyroid doses and a small decrease in the whole body doses, the proposed change does not result in a significant increase in the consequences of an accident previously evaluated.

2. **The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.**

Since the FSAR analysis already assumes bypass leakage occurs, the proposed action does not represent an accident of a different type. Additionally, the change in dose analysis methodology does not create an accident or malfunction of a different type since it only involves the analysis of the effects of such accidents.

3. **The proposed change does not involve a significant reduction in a margin of safety.**

This question addresses changes in system parameters only. Dose consequences are addressed in Section 1 above. The proposed action increases the assumed SCBL from 5 to 9 scfh. This leakage is outside the reactor building, and hence, has no impact on reactor building temperatures or pressures so that they become closer to acceptance limits. Likewise, no other system parameter values become closer to limits as a result of these changes in leakage. Consequently, the existing margin of safety between the licensing basis results and system parameter acceptance limits is not reduced. Thus, no decrease in margin of safety results.

**ENVIRONMENTAL CONSEQUENCES**

An environmental assessment is not required for the proposed change because the requested change conforms to the criteria for actions eligible for categorical exclusion as specified in 10 CFR 51.22(c)(9). The requested change will have no impact on the environment. The proposed change does not involve a significant hazards consideration as discussed above. The proposed change does not involve a significant change in the types or significant increase in the amounts of any effluents that may be released offsite. In addition, the proposed change does not involve a significant increase in the individual or cumulative occupational radiation exposure.