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SUBJECT: Forwards proposed amend 186 to license NPF-14, extending on one time basis, AOT from 3 to 7 days for one offsite circuit being out of svc. Engineering Study EC-RISK-1050, "Impact of Extending T-10 AOT From 3 to 7 Days" also encl.

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**SUSQUEHANNA STEAM ELECTRIC STATION  
PROPOSED AMENDMENT NO. 186 TO  
LICENSE NPF-14: ONE TIME EXTENSION OF  
AOT FOR ONE OFFSITE CIRCUIT  
PLA-4302 FILE R41-2**

Docket No. 50-387

Dear Sir:

The purpose of this letter is to transmit a proposed amendment to the Susquehanna SES Unit 1 Technical Specifications. The proposed change extends on a one time basis the Allowed Outage Time (AOT) from 3 to 7 days for one offsite circuit being out of service.

**BACKGROUND**

The power supply to T-10 is currently tapped directly off the 47 mile Montour-Mountain 230 kV line. This arrangement exposes T-10 to interruptions for a disturbance anywhere along the 47 mile Montour-Mountain line. The power supply to T-10 is being modified to improve its reliability. The modification to be installed includes three elements.

The first element consists of segmenting the existing Montour-Mountain line into two new lines (the 18 mile Mountain-T-10 line and the 29 mile Montour-T-10 line). This arrangement will allow T-10 to remain in service following the loss of either line.

The second element consists of constructing a T-10 tap switch yard with a three breaker ring bus arrangement. This design and layout should result in minimum outage exposures to T-10.

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The third element is the separation of the relaying and control circuits for both T-10 and T-20. Currently, the relaying and control equipment are in the same panel in the control room. This equipment will be relocated to the switch gear rooms in the Turbine Building. Relocating this equipment will:

- eliminate exposure to common cause loss of both T-10 and T-20 during periodic testing of relaying components;
- reduce exposure to common cause loss of both T-10 and T-20 due to accidental bumping;
- provide physical separation of T-10 and T-20 relaying and control equipment.

These modifications to T-10 result in a significant improvement in the reliability of T-10 and reduce the common cause outage of both T-10 and T-20. Also after these modifications have been completed, the core damage frequency for Susquehanna SES will decrease by about 30% for LOOP events.

These modifications are scheduled to be installed during the Unit 2 Seventh Refueling and Inspection Outage (Unit 2 7th RIO). This outage is presently scheduled to begin on September 16, 1995. It is estimated that the construction and installation of these modifications may require T-10 to be out of service for up to 7 days. The current Technical Specifications only allow T-10 to be out of service for up to 3 days. Therefore, in order to avoid a dual unit shutdown a one time extension to allow T-10 to be out of service for 7 days is being proposed.

#### **DESCRIPTION OF CHANGE**

This proposed change adds a footnote to Action a.3 of Specification 3.8.1.1 to allow, on a one time basis, one offsite circuit to be out of service for up to 7 days during the construction and installation of the T-10 tap 230 kV switch yard during the Unit 2 7th RIO. This change is applicable to Unit 1 only since Unit 2 will be in an outage and will not require two offsite circuits to be available.

Refer to the attached marked up Technical Specifications.

#### **SAFETY ANALYSIS**

In order to evaluate the effect of increasing the AOT for T-10 from 3 to 7 days, the increase in core damage frequency and containment failure frequency from LOOP events were calculated. This evaluation process:

- identified the dominate accident sequences initiating from LOOP,
- estimated the increase in the core damage frequency from extending the T-10 AOT from 3 to 7 days, and
- evaluated the risk reduction derived from mitigating actions.

Accidents initiated from LOOP represent about 43% of the core damage frequency, but only 0.2% of the containment failure frequency. Therefore, only the core damage sequences were evaluated. A review of the IPE identified the following as the dominate accident sequences initiating from a LOOP:

- Anticipated Transient Without Scram (ATWS) with additional equipment failures,
- LOOP with additional equipment failures, and
- Station Blackout (SBO) with additional equipment failures.

The T-10 outage to install the modifications directly impacts the LOOP frequency in that the loss of T-20 will directly result in a LOOP. Therefore, the increase in the core damage frequency during the T-10 work window can be estimated by scaling the existing damage frequencies by the ratio of the LOOP frequency during the work window to the LOOP frequency used in the IPE. The LOOP frequency used in the IPE is based upon a model described in NUREG-1032, "Evaluation of Station Blackout Accidents at Nuclear Power Plants." In this model, LOOP events are attributed to four causes: plant centered, grid centered, severe weather centered and extreme weather.

This modification will only impact the frequency of plant centered LOOPS. Plant centered LOOPS involve hardware failures, design deficiencies, human errors during maintenance or switching, and other common cause events that simultaneously interrupt power to both transformers. With T-10 out of service, single independent failures associated with T-20 will result in a LOOP. The plant centered cause will increase during the outage due to independent faults associated with T-20. Since the increase in the plant centered LOOP frequency is associated with independent faults on T-20, the common cause contribution to plant centered LOOPS remains constant.

Analyses indicates that the impact of grid and weather centered LOOPS resulting from the extension of the allowed outage time for the T-10 power supply is negligible.

Since the T-10 work window's impact is limited to plant centered LOOPS, only the plant centered LOOP frequency needed to be evaluated for the change during the work window. No specific algorithm was provided in NUREG-1032 for computing the incidence rate of plant

centered LOOPS. Therefore, the plant centered LOOP frequency is taken as the log normal medium of the common outage rate of T-10 and T-20. The lower bound is taken as the independent probability of both T-10 and T-20 being unavailable. The upper bound is taken as the 95% confidence limit on the joint outage of T-10 and T-20 based upon zero failures in 7 site years and the chi square distribution.

The analysis showed that increasing the AOT from 3 to 7 days adds an additional 6% to the core damage frequency above what is presently allowed by technical specifications. This analysis provided an estimate of the increase in core damage frequency associated with T-10 assuming it could occur anytime during the year and with equipment outage during the work window governed strictly by the Technical Specifications. However, if mitigating measures are taken for Unit 1 and common equipment, the core damage frequency during the modification can be reduced. These measures include:

1. prohibiting high risk activities within the confines of the plant or the grid system that may result in a loss of T-20 during the T-10 outage,
2. performing the modification during the Fall when the frequency of grid and weather related LOOPS are reduced,
3. requiring that if HPCI System is declared inoperable during the T-10 work window, the HPCI System shall be returned to operable status within 1 hour or be in at least Hot Shutdown within 12 hours and in at least Cold Shutdown within the subsequent 24 hours.
4. requiring that if Standby Liquid Control System (SLCS) is declared inoperable during the T-10 work window, the SLCS shall be returned to operable status within 1 hour or be in at least Hot Shutdown within 12 hours and in at least Cold Shutdown within the subsequent 24 hours.
5. requiring that within 24 hours prior to taking T-10 out of service, Surveillance 4.8.1.1.2.a.4 be successfully completed on the aligned diesel generators, and
6. maintaining the following equipment operable during the T-10 work window and restoring any failed system/component to operable status as soon as possible (The failed system/component shall be worked around the clock):
  - both CRD pumps,
  - diesel fire pump, yard fire hydrant (1FH122) and associated hydrant hose station,
  - RHR/RHRSW/ESW for suppression pool cooling,
  - RHR/RHRSW cross tie valves,

- RCIC,
- CIG 150 psig header and bottles,
- Turbine Building Closed Cooling Water (one pump and heat exchanger)
- portable diesel generator,
- HV-141-F019.

Initiating the above compensatory measures greatly reduces the core damage frequency when the AOT for T-10 is increased from 3 to 7 days. These measures reduce the increase in core damage frequency to within the risk envelope allowed by the existing Technical Specifications.

Attached Engineering Study, EC-RISK-1050, "Impact of Extending the T-10 AOT from 3 to 7 Days," provides the details of the analysis.

#### NO SIGNIFICANT HAZARDS CONSIDERATIONS

*I. Involve a significant increase in the probability or consequences of an accident previously evaluated.*

The consequences of losing offsite power have been evaluated in the FSAR and the Station Blackout evaluation. Increasing the AOT for T-10 from 3 to 7 days does not increase the consequences of a LOOP event nor change the evaluation of LOOP events as stated in the FSAR or Station Blackout evaluation.

Allowing T-10 to be removed from service for an additional 4 days does increase slightly the probability of a LOOP event as shown in PP&L's engineering study. However, implementing the following compensatory actions reduces the probability of a LOOP event:

1. prohibiting high risk activities within the confines of the plant or the grid system that may result in a loss of T-20 during the T-10 outage,
2. performing the modification during the Fall when the frequency of grid and weather related LOOPS are reduced,
3. requiring a unit shutdown if the HPCI system becomes inoperable during the T-10 outage,
4. requiring a unit shutdown if the SLCS becomes inoperable during the T-10 outage,
5. requiring that within 24 hours prior to taking T-10 out of service, Surveillance 4.8.1.1.2.a.4 be successfully completed on the aligned diesel generators, and

6. maintaining the following equipment operable during the T-10 work window and restoring any failed system/component to operable status as soon as possible (The failed system/component shall be worked around the clock):
- both CRD pumps,
  - diesel fire pump, yard fire hydrant (1FH122) and associated hydrant hose station,
  - RHR/RHRSW/ESW for suppression pool cooling,
  - RHR/RHRSW cross tie valves,
  - RCIC,
  - CIG 150 psig header and bottles,
  - Turbine Building Closed Cooling Water System (one pump and heat exchanger),
  - portable diesel generator,
  - HV-141-F019.

Therefore, this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

***II. Create the possibility of a new or different kind of accident from any accident previously evaluated.***

Allowing the AOT for T-10 to increase from 3 to 7 days is a one time exemption in order to install the new T-10 tap and 230 kV switch yard. The accident analyses affected by this extension are the LOOP events. The remaining portions of the station and equipment are not altered by this change. The potential for the loss of other plant systems or equipment to mitigate the effects of an accident are not altered. One offsite source of power will be out of service for an additional 4 days and compensatory actions will be initiated to lessen the effect of having the offsite power source out of service for an additional 4 days. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

***III. Involve a significant reduction in a margin of safety.***

The proposed change allows, on a one time basis, T-10 to be out of service for an additional 4 days. This increase in AOT for T-10 results in a slight decrease in the margin of safety (defined as core damage frequency) with respect to having two offsite sources available per Specification 3.8.1.1. By implementing the compensatory measures as described in Item 1 above, the margin of safety is increased to be the equivalent of allowing the offsite power



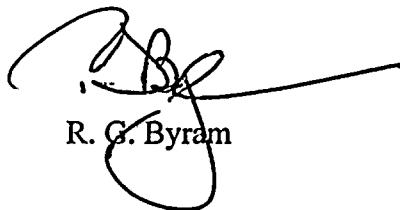
source (T-10) to be out of service for 3 days as is allowed by the existing Specification. Therefore, this one time exemption will not involve a significant reduction in safety margin.

**IMPLEMENTATION**

Pennsylvania Power & Light Company requests that this change be approved by August 9, 1995, in order to support the installation of the 230 kV switch yard during the next scheduled refueling on Unit 2.

If you have any questions, please contact Mr. C. T. Coddington at (610) 774-7915.

Very truly yours,



R. G. Byram

Attachment

cc: NRC Region I  
Ms. M. Banerjee, NRC Sr. Resident Inspector  
Mr. C. Poslusny, NRC Sr. Project Manager  
Mr. W. P. Dornsife, PA DER



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