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CURTIS,N.W. Pennsylvania Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
SCHWENCER,A. Licensing Branch 2

SUBJECT: Application for amends to Licenses NPF-14 & NPF-22.Amends change Tech Specs re diesel generator testing w/one generator out of svc & circuitry & pumps associated w/ out-of-svc generators.Fee paid.

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Norman W. Curtis
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DEC 21 1984

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED AMENDMENT NO. 58 TO NPF-14
AND PROPOSED AMENDMENT NO. 13 TO NPF-22
ER 100450 FILE 841-8 Docket Nos. 50-387
PLA-2346 50-388

Dear Mr. Schwencer:

The purpose of this letter is to request a one time exemption to Technical Specifications 3.8.1.1 and 3.7.1.2 to allow Pennsylvania Power & Light Co. to remove the diesel generators one at a time from service for an accumulated time of 60 days. This exception is required in order to perform work on the connection of the control and power circuits to the new fifth diesel at Susquehanna SES. Attachment A shows the proposed wording for this exemption.

The following is a description of the proposed changes to Technical Specification 3.8.1.1:

o <u>ACTION a</u>

1. The reference to the loss and restoration of one offsite circuit has been deleted since in order to be in the proposed action it is assumed that one diesel generator is already out of service and therefore a loss of one offsite circuit would be covered in ACTION b.

2. The testing requirements for the remaining diesel generators have been modified to allow the diesel generators to first be tested within 24 hours and then every 72 hours. The increased testing time between tests provides assurance that the diesel generators will be OPERABLE without degrading the performance of the diesels, since this time is equivalent to the testing requirements for diesels with 4 or more failures per last 100 valid tests. This testing frequency is consistent with the testing frequency as stated in Generic Letter 84-15.

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3. The time one diesel generator can be out of service was revised to an accumulated 60 days for all four diesel generators. This accumulated 60 days is only used for the diesel generators when they are taken out of service in order to do the necessary interconnections associated with the new fifth diesel generator project.

4. The exemption to the requirements of Specification 3.0.4 has been added to allow restart of the units if they should happen to have to shutdown.

o ACTION b

1. The testing requirements for the remaining diesel generators have been modified to allow the diesel generators to first be tested within 24 hours and then every 72 hours. Testing on a frequency of 72 hours is consistent with the maximum testing frequency required for diesels with 4 or more failures per last 100 valid tests.

2. This action has been rewritten to clarify that when the two offsite circuits have been restored, a diesel generator may remain out of service provided it is out of service for work connected with fifth diesel project.

o ACTION c

1. The words "except as noted in Specification 3.7.1.2" have been added to alert the operators that the ESW pump associated with the inoperable diesel generator will not automatically start upon demand.

o ACTION d

1. This action statement has been revised to allow only three diesel generators to be OPERABLE instead of four.

2. The time to restore both offsite circuits has been revised to be consistent with proposed ACTION b.

3. This action has been rewritten to clarify that when the two offsite circuits have been restore, a diesel generator may remain inoperable provided it is inoperable for work connected with fifth diesel project.

o ACTION e

1. This action has been rewritten to clarify that when the three diesel generators have been restored, a diesel generator may remain inoperable provided it is inoperable for work connected with fifth diesel project.

Technical Specification 3.7.1.2, ACTION a.1 has been revised to clarify that an ESW pump may remain inoperable until its associated diesel generator is restored to OPERABILITY.

This proposed extension to the Limiting Condition of Operation (LCO) is justified because of the following reasons:

(1) The design of our offsite AC circuits as described in Section 8.2 of the Final Safety Analysis Report.

(2) The results of our probabilistic evaluation on extending the diesel generator LCO.

Current Technical Specifications allow continued dual unit operation for up to three days with a diesel generator inoperable. The associated action statement requires demonstration of operability of the remaining diesel generators and the offsite AC sources. This assures the capability of affecting a safe shutdown and mitigating the effects of a design basis accident. This is maintained with (1) the onsite AC power system (3 diesel generators) or (2) the two offsite AC power sources.

Since the electrical AC power sources are degraded below the Technical Specification LCO, a time limit on continued operation is specified. This limits the exposure time in the degraded condition which in turn minimizes the risk associated with this level of degradation. The LCO in the case of one diesel generator is not too severe due to the redundancy of AC power sources which remain.

We have probabilistically evaluated the impact of temporarily extending the diesel generator Limiting Condition of Operation (LCO) from 3 days per diesel to 60 days total for all four diesels one at a time. It is estimated that as many as 15 days per diesel could be required to complete the tie-in. Thus without this temporary extension a dual unit shutdown is required. A recent draft report prepared by Battelle Columbus Laboratories for NRC entitled, "Determination of Allowed Outage Times (AOTs) from a Risk and Reliability Standpoint" (July 1984) states that AOT extensions are only justifiable if there is insufficient time to perform a task and there is no significant increase in total risk. The results of our analysis (discussed later) show no significant risk increase.

Several tasks were performed to examine the impact this extension has on the unavailability of system required to insure adequate core cooling (the assumed indicator of risk). These steps are outlined below:

1. identify loss of offsite power (LOOP) sequences which when coupled with a diesel in an LCO would result in inadequate core cooling,

2. estimate the LOOP frequency and the safety function unavailabilities,

3. estimate the frequency of inadequate core cooling with and without the temporary technical specification change.

Sequences leading to inadequate core cooling are identified using the event tree illustrated in Figure 1. The LOOP frequency and system unavailabilities associated with the event tree heading are derived from data available in open literature. The LOOP frequency and system unavailabilities were combined using the event tree logic to obtain the yearly frequency of inadequate core cooling. This yearly frequency was calculated for two conditions: with all four diesel generators in standby, and with three in standby and one in a LCO. The frequency of inadequate core cooling (per year) is then calculated by summing these frequencies weighted by the yearly fraction of time in each condition. The equation for the frequency of inadequate core cooling is as follows:

$$\text{Frequency of Inadequate Core Cooling} = \frac{365.25 - \text{days in LCO}}{365.25} F_2 + \frac{\text{days in LCO}}{365.25} F_3$$

F_2 = The frequency of inadequate core cooling with all diesels in standby.

F_3 = The frequency of inadequate core cooling with either diesel A or B in an LCO.

For the LOOP frequency and system unavailabilities associated with the event tree headings, the following references were used:

- Loss of Offsite Power at U.S. Nuclear Power Plant - All Years Through 1983, NSAC-80, July 1984, H. Wychaft
- Precursors to Potential Severe Core Damage Accidents: 1980-1981, A Status Report, W. B. Cottrell, etal. ONRL/NSIC-217/V1 & 217/V2.
- Precursors to Potential Severe Core Damage Accidents: 1969-1979, A Status Report, J. W. Minerick, C. A. Kukielka, ORNL/NSIC-182/V1 and 182/V2.
- Reactor Safety Study, Wash-1400, Appendix II, 1975.
- NSAC HPCI/RCIC failure data.

The increased risk associated with continued operation of both units with a diesel generator inoperable for 3 days is acceptable. Arguments supporting this statement are found in the applicable Technical Specification Bases section and Regulatory Guide 1.93. In this evaluation risk is defined as the probability of inadequate core cooling during a LOOP. The proposed temporary change in the diesel generator LCO increases the frequency of LOOP sequences leading to inadequate core cooling from 5.0×10^{-6}/yr. to no more than 6.4×10^{-6}/yr. This represents a minimal impact when considering the uncertainties in the data.

The temporary LCO extension has no impact on the probability of inadequate core cooling when offsite power is available. The design of the onsite AC power supplies is such that only three diesel generators are required to fulfill the electric power requirements for the ECCS equipment assuming a loss of offsite power, a LOCA in one unit and the shutdown of the other unit. As was shown in the evaluation the increased frequency of inadequate core cooling during the LCO extension is small and therefore the one time LCO extension is acceptable.

In order to assure thoroughness and incorporation of recent ideas on Technical Specification changes, the draft Program Plan for Procedure Evaluating Technical Specifications (prepared for NRC by Brookhaven National Laboratory, October 1984) was reviewed. This report identifies 23 issues which should be addressed in the evaluation of Allowed Outage Times (AOTs). Many of these were determined to be irrelevant to this request. However the following are relevant: analysis level (e.g. system, function, core-damage, etc.), risk importance of the diesel generators, common cause failure, uncertainty, operating accident risk, the length of repair time, and system reconfiguration. Common cause failures, uncertainties, operating accident risk, and system reconfiguration were explicitly addressed in the probabilistic analysis. The length of repair was previously mentioned as the reason for the one-time extension request. The remaining issues are discussed below.

The impact of the extended AOT on operating accident risk was evaluated with respect to inadequate core cooling (as a measure of core damage). This level of analysis was selected since it did not require reference to a full plant probabilistic risk assessment (PRA) and is a level at which the results can be viewed with a meaningful perspective. The availability of diesel generators only affects accident sequences which include a loss of offsite power (LOOP). These are typically low contributors to core damage frequency and public risk as illustrated through the risk achievement worth. Findings of the NRC Accident Sequence Precursor Program show the risk achievement worth is only 9.8×10^{-6} for emergency power as compared to 3.5×10^{-1} for long term core cooling. This means the diesel generators would have a relatively low risk importance. The results of our analysis show a negligible increase in the frequency of LOOP sequences which can lead to inadequate core cooling. Therefore, the overall impact on operating accident risk during the AOT is negligible. This negligible increase should be more than offset by the additional capability of the extra diesel generator over the plant lifetime. This diesel is expected to significantly reduce the number of shutdowns and startups of one unit primarily due to the performance of required maintenance (which takes more than three days) during refueling of the other units.

While a diesel generator is removed from service for the modifications, it will not be able to respond to automatic or manual start signals. Therefore, there is no need to consider failures induced during the AOT. The analysis was performed with the assumption that the modifications would be completed in a manner that would not induce a common cause failure of other diesel generators or equipment. A review of the modifications and installation

details will insure that a common cause failure will not be induced during the modification work.

The proposed change does 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.

The determination is based on the probabilistic evaluation, as described above, and therefore is an example as provided in 48FR14780, Column 3, paragraph (vi).

Pursuant to 10CFR170.22, the appropriate fee is enclosed.

We would request that this one time Technical Specification change be made effective on July 1, 1985.

Very truly yours,

N. W. Curtis
Vice President-Engineering & Construction-Nuclear

Enclosures

cc: M. J. Campagnone USNRC
R. H. Jacobs USNRC

T. M. Gerusky, Director
Bureau of Radiation Protection
Pennsylvania Dept. of Environmental Resources
P. O. Box 2063
Harrisburg, PA 17120

BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter of :

PENNSYLVANIA POWER & LIGHT COMPANY : Docket No. 50-387

PROPOSED AMENDMENT NO. 58

FACILITY OPERATING LICENSE NO. NPF-14

SUSQUEHANNA STEAM ELECTRIC STATION
UNIT NO. 1

Licensee, Pennsylvania Power & Light Company, hereby files proposed Amendment No. 58 to its Facility Operating License No. NPF-14 dated July 17, 1982.

This amendment contains a revision to the Susquehanna SES Unit 1 Technical Specifications.

PENNSYLVANIA POWER & LIGHT COMPANY
BY:

N. W. Curtis
Vice President - Engineering &
Construction - Nuclear

Sworn to and subscribed before me
this 28th of December, 1984.

Notary Public
MARTHA C. BARTO, Notary Public
Allentown, Lehigh County, Pa.
My Commission Expires Jan. 13, 1986

BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter of :

PENNSYLVANIA POWER & LIGHT COMPANY : Docket No. 50-388

PROPOSED AMENDMENT NO. 13

FACILITY OPERATING LICENSE NO. NPF-22

SUSQUEHANNA STEAM ELECTRIC STATION
UNIT NO. 2

Licensee, Pennsylvania Power & Light Company, hereby files proposed Amendment No. 13 to its Facility Operating License No. NPF-22 dated March 23, 1984.

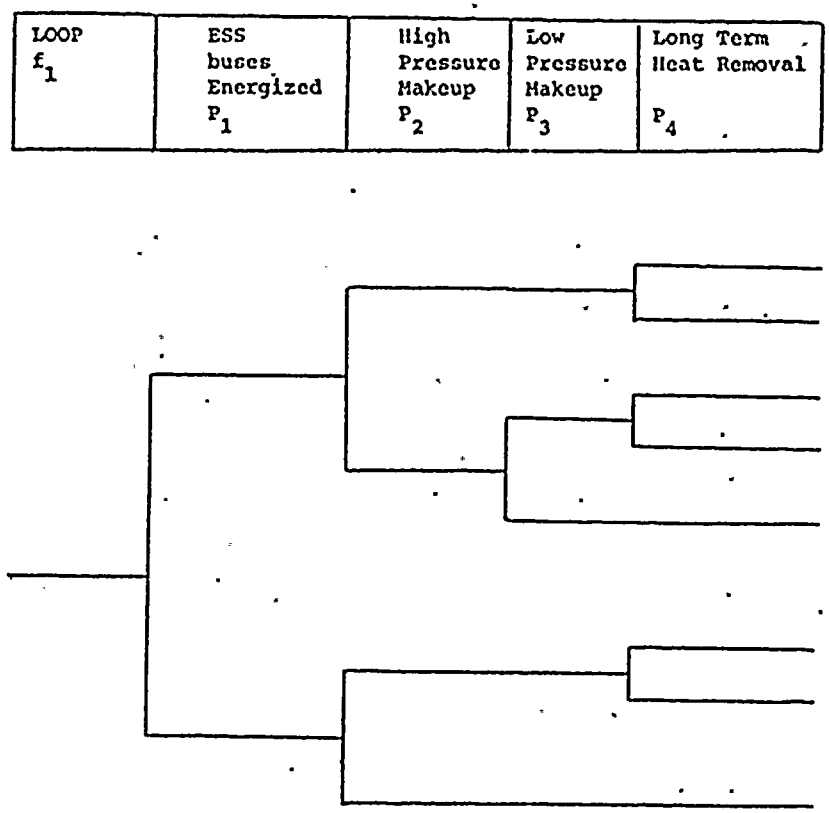
This amendment contains a revision to the Susquehanna SES Unit 2 Technical Specifications.

PENNSYLVANIA POWER & LIGHT COMPANY
BY:

N. W. Curtis
Vice President - Engineering &
Construction - Nuclear

Sworn to and subscribed before me
this 20th of December, 1984.

Notary Public
MARTHA C. BARTO, Notary Public
Allentown, Lehigh County, Pa.
My Commission Expires Jan. 13, 1986



Adequate Core Cooling	Yearly Frequency of Inadequate Core Cooling: Normal f_2	Yearly Frequency of Inadequate Core Cooling: LCO f_3
yes	-	-
no	3.9×10^{-6}	3.7×10^{-6}
yes	-	-
no	8.6×10^{-9}	8.2×10^{-9}
no	4.4×10^{-9}	4.4×10^{-9}
yes	-	-
no	3.6×10^{-7}	4.7×10^{-6}
no	4.8×10^{-7}	6×10^{-6}
Total	4.8×10^{-6}/year	1.5×10^{-5}/year

Figure 1: Event Tree for Loss of Offsite Power at SSES

EVENT TREE LEGEND

Symbol	Definition
F_1	Yearly frequency of a Loss Of Offsite Power
P_1	Probability that ESS buses 1A201 and 1A202 are not energized
P_2	Probability that high pressure makeup fails
P_3	Probability that low pressure makeup fails
P_4	Probability that long term heat removal is unavailable
f_2	Yearly frequency of inadequate core cooling with all buses not energized
f_3	Yearly frequency of inadequate core cooling with one bus in LCO