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SUBJECT: Requests waiver of compliance from TS 3.8.1.1.

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Harold W. Keiser  
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September 1, 1990

Mr. Thomas T. Martin, Administrator  
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**SUSQUEHANNA STEAM ELECTRIC STATION  
REQUEST FOR WAIVER OF COMPLIANCE  
PLA-3438                      FILES A17-2/R41-2**

Docket Nos. 50-387  
& 50-388

Dear Mr. Martin:

The purpose of this letter is to request a waiver of compliance from Technical Specification 3.8.1.1 (A.C. Sources-Operating) Action b. This 72-hour action was entered at 1200 hours (i.e., noon) on August 30, 1990. This submittal evaluates an increase in the action time from 72 hours to 15 days. At this time, however, it is requested that the waiver increase the action time by 4 days (from 72 hours to 7 days). This time will be utilized to prepare an emergency Technical Specification change request that will represent PP&L's formal request for the full extension to 15 days.

Description of Condition

On August 29, 1990, during a borescopic inspection of Emergency Diesel Generator OG501D, heavy scoring of the cylinder liners on five engine cylinders was observed. Further inspection revealed damage to several additional cylinder liners and the presence of aluminum oxide in the engine. The aluminum oxide was introduced to the engine as residual material from sandblasting performed on the engine intercoolers during a recent maintenance activity. Intake air, passing through the intercoolers, picked up this residual material and introduced it to the engine. Once in the engine, the aluminum oxide became an abrasive acting between the engine cylinders and cylinder liners, resulting in the heavy scoring observed on the cylinder liners.

A review of recent engine lube oil samples taken on OG501D revealed the presence of increased levels of chrome. The source and significance of this condition was not immediately recognized but coupled with the inspection results noted above, we now know the source of the chrome to be from the scored cylinder liners.

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The maintenance overhaul which lead to the introduction of aluminum oxide into OG501D was similar to overhauls performed on Emergency Diesel Generators OG501A,B, and C over the past six months. As such, the potential for a similar condition on these three engines exists. The results of our investigation of this potential are as follows.

### Investigation Results

The source of the aluminum oxide in OG501D has been confirmed to be the intercoolers installed in that engine. These intercoolers had previously been installed in OG501A. During the overhaul evolution they had been removed from OG501A, inspected and cleaned, (including sandblasting the tube side of the cooler with aluminum oxide) and then reinstalled in OG501D. Precautions against introduction of aluminum oxide to the shell side of the cooler were inadequate. The sequence of the engine overhauls was:

1. OG501C
2. OG501A
3. OG501D
4. OG501B

A similar sequence of intercooler removal, cleaning and reinstallation existed for each engine except for OG501C. Since it was the first engine to undergo its overhaul, new intercoolers delivered from the vendor were reinstalled in it. As a result we have high confidence that this condition does not exist in OG501C.

The intercoolers that were removed from OG501C were reinstalled in OG501A. The boroscopic inspection that revealed the scoring of the cylinder liners on OG501D has already been completed on OG501A. These inspections revealed no visible damage. During this inspection period, the air intake manifold was removed from OG501A to support installation of an engine modification. No evidence of aluminum oxide was present. In addition, two recent lube oil samples taken on OG501A were reviewed. Unlike the sample for OG501D, the level of chrome present in the lube oil was normal. The damage from introduction of aluminum oxide manifests itself quickly. OG501D has only 20 hours of run time since completion of its maintenance overhaul. Conversely, OG501A has 43 hours of run time since its maintenance overhaul which we believe is adequate to result in cylinder liner scoring in the presence of even small quantities of aluminum oxide. For these reasons we have a high confidence level that OG501A does not have this condition. The intercoolers that were removed from OG501D were reinstalled in OG501B. This engine has yet to undergo its post overhaul inspection. A review of recent lube oil samples was performed and

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an increased level of chrome was observed. As a result, OG501B was declared inoperable at 1200 on August 30, 1990 and Tech Spec Action 3.8.1.1.b was entered on both units. An immediate inspection was performed and evidence of aluminum oxide was found in the air intake manifold, confirming the existence of the condition on OG501B.

OG501E, the spare diesel generator at Susquehanna, is presently substituting for OG501D. It was not part of the recent overhauls. Its intercoolers have not been recently removed and sandblasted. A review of lube oil samples on this engine shows normal levels of chrome. Based on this information, a similar condition does not exist on OG501E.

#### Requirements for which Waiver is Requested

It is requested that the LCO Action time for Tech Spec Action 3.8.1.1.b on both units be extended from 72 hours to 7 days to allow continued operation of Unit 1 and 2. This extension will provide us with sufficient time to prepare, submit, and allow NRC review of an emergency Technical Specification change that will justify the additional time necessary to finish performing a thorough inspection, cleaning, and restoration of OG501B.

#### Compensatory Actions

We have confirmed that the three aligned Diesel Generators do not have the degraded condition experienced by OG501B and D. As such, their reliability during this period of time is not impaired. As noted above, Diesel Generators OG501A and C have recently undergone a rigorous maintenance overhaul and installation of modifications to improve their reliability.

The following additional compensatory measures will also be performed in support of the extended action time:

1. The spray pond bypass valve on each division will be maintained open to assure availability of Diesel Generator Cooling.
2. Per Technical Specification 3.8.1.1, Action B.2., we are required to perform Surveillance Requirement 4.8.1.1.2.a.4 within 24 hours. It is proposed that this surveillance be performed every 72 hours thereafter for the duration of the extended action time. This will serve to provide additional assurance of the reliability of the three operable diesel generators.

3. To further reduce the risk of challenges to the offsite power supply, discretionary power changes on both Units 1 and 2 will be avoided.
4. No discretionary maintenance or modification work will be performed on the following systems: ECCS (including the support functions provided by ESW and RHRSW), RCIC, CRD system, DC power systems, and AC Power Distribution systems.

#### Safety Significance and Consequences of Proposed Request

The proposed request is not a significant safety concern as described above. We have already identified the unique cause of this condition and confirmed the three aligned Diesel Generators are operable. The additional time is needed to assure thorough inspection, cleaning and restoration of OG501B. The compensatory actions outlined above further reduce the probability of any safety consequences from this request.

PP&L has performed a risk evaluation of a 12-day extension to the 72-hour action time. This evaluation is based upon the 1986 Individual Plant Evaluation for SSES that has been submitted to the NRC. The equation used to quantify the estimated increase in total plant damage is:

$$\text{Annual Risk} = (1.4 \times 10^{-8}) f_1 + (7.0 \times 10^{-8}) f_2,$$

where  $f_1$  = annual fraction when the A, B, C and D diesel generators are in service and the E diesel generator is available to be put in service (normal configuration),

and  $f_2$  = annual fraction when only three diesel generators are operable, and one of the three is the E diesel generator (current configuration).

The value of  $1.4 \times 10^{-8}$ /year is based on the IPE evaluation of the affect of opening the spray pond bypass valve for both divisions. The value of  $7.0 \times 10^{-8}$ /year is based on the IPE evaluation of the current diesel generator configuration. The evaluation of this equation for the 72-hour action time results in an annual risk for total plant damage of  $1.45 \times 10^{-8}$ . For 15 days, the result is  $1.63 \times 10^{-8}$ . This yields an increase of 13%. This evaluation assumed that the aforementioned compensatory actions 1. and 4. are implemented.

PP&L does not believe that this increase is significant for the following reasons:

1. The result is lower than the total plant damage frequency submitted to the NRC in the original (1986) IPE ( $2.1 \times 10^{-7}$ /year), and
2. The percentage increase is lower than what was accepted by the NRC in their safety evaluation of PP&L's submittal to extend the same action times in support of tying in the 'E' diesel generator -- 33% (Reference: Amendment Nos. 51 and 19, dated December 3, 1985).

No Significant Hazards Considerations

1. This proposal does not involve a significant increase in the probability or consequences of an accident previously evaluated. The three remaining Diesel Generators will be operable. Therefore Susquehanna will be in a configuration that is bounded by prior deterministic analysis, assuming a single failure has occurred. Furthermore, as described above, the risk of total plant damage on an annual basis has increased, but it is not considered significant because:
  - a. it is lower than the total plant damage frequency in the original IPE, and
  - b. the percentage increase is lower than what was accepted by the NRC in a prior safety evaluation to extend the same action times in order to tie in the 'E' diesel generator.
2. This problem does not create the possibility of a new or different kind of accident from any accident previously evaluated. The evolution involved is one of restoration to acceptable standards. No change in the operation or function of the Diesel Generators is proposed.
3. This change does not involve a significant reduction in a margin of safety. If an emergency were to arise during the existing LCO or the extension, it is possible to address the safe operation of both units with the three remaining operable Diesel Generators. Furthermore, compensatory actions have been proposed to assure the reliability of these diesels and other safety systems which mitigate the risk of an event should one occur. This does not represent a significant reduction in a margin of safety.

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### Environmental Consequences

As stated above, for the duration of the proposed waiver it is anticipated that Susquehanna will be in a condition that functionally meets the design basis (assuming a single failure has occurred). Therefore, no environmental consequences that have not been previously considered are anticipated.

### Conclusion

Both units at Susquehanna SES are currently in a 72-hour LCO on the B Diesel Generator due to the introduction of a foreign material (aluminum oxide) into the engine. A waiver of compliance is requested to allow a 4-day extension of this LCO. This extension will be used to ensure sufficient time to prepare, submit, and allow NRC review of an emergency Technical Specification change that will justify the additional time necessary to restore the B Diesel Generator to operable status. It is proposed that this waiver be approved immediately with the following conditions:

1. The waiver will become effective at 1200 hours on September 2, 1990.
2. The waiver will expire upon declaring the B Diesel Generator operable, but not to exceed 4 days.

Any questions on this request should be directed to Mr. J. M. Kenny at (215) 770-7904.

Very truly yours,



H. W. Keiser

cc: NRC Document Control Desk (original)  
Dr. W. R. Butler - NRR - OWFN  
Mr. G. Scott Barber, NRC Sr. Resident Inspector - SSES  
Mr. T. M. Gerusky - Pennsylvania DER