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 RECIP. NAME RECIPIENT AFFILIATION
 BUTLER, W.R. Project Directorate I-2

SUBJECT: Forwards application for Amends 135 & 86 to Licenses NPF-14 & NPF-22, extending diesel generator restoration time.

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SEP 04 1990

Director of Nuclear Reactor Regulation
Attention: Dr. W. R. Butler, Project Director
Project Directorate I-2
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED AMENDMENTS 135 AND 86 TO
LICENSE NOS. NPF-14 AND NPF-22:
EMERGENCY REQUEST TO EXTEND DIESEL
GENERATOR RESTORATION TIME
PLA-3440 FILES A17-2/R41-2

Docket Nos. 50-387
and 50-388

Reference: Letter, PLA-3438, H.W. Keiser to T.T. Martin,
"Request for Waiver of Compliance," dated September
1, 1990.

Dear Dr. Butler:

Via the referenced letter, PP&L transmitted a request for a waiver of compliance from the 72-hour action time specified in Technical Specification 3.8.1.1 (A.C. Sources - Operating) Action b. This action was entered at 1200 hours on August 30, 1990. On September 1, 1990, a 4-day extension of the action time was granted by NRC Region I. A 12-day extension is actually expected to be needed to restore the LCO, but the time granted was the maximum allowed by current NRC policy on waivers of compliance. Therefore, this emergency Technical Specification change request is being proposed in order to gain the additional 8 days needed to restore the LCO.

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

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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.

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, spare intercoolers were reinstalled in it. These intercoolers were not cleaned during the recent maintenance overhaul during which we believe the intercoolers currently installed in OG501 B and D were contaminated. Furthermore, recent lube oil samples revealed no abnormal levels of chrome, and no evidence of aluminum oxide was found during inspections. As a result we have high confidence that this condition does not exist in OG501C. (NOTE: This discussion has been changed from the referenced waiver of compliance request. We have since determined that the intercoolers installed in OG501C were spares rather than new intercoolers from the vendor.)

[Faint, illegible text scattered across the page, possibly bleed-through from the reverse side.]

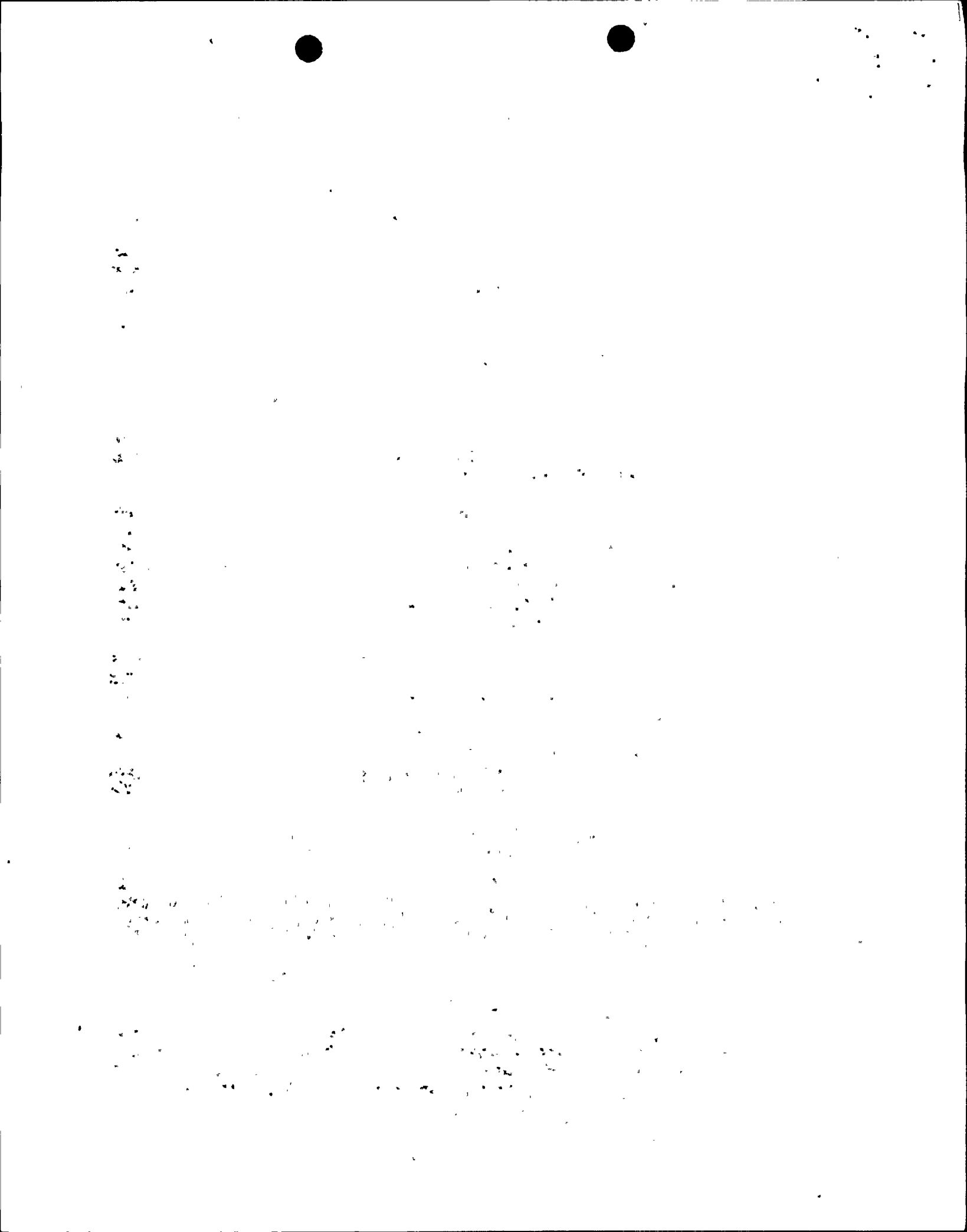
The intercoolers that were removed from OG501C were reinstalled in OG501A. The borescopic inspection that revealed the scoring of the cylinder liners on OG501D has already been completed on OG501A. These inspections revealed no visible damage. During this inspection period, the air intake manifold was 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 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.

Description of Proposed Changes

It is requested that the LCO Action time for Technical Specification Action 3.8.1.1.b on both units be extended from 72 hours to 15 days. This extension will provide us with sufficient time to finish performing a thorough inspection, cleaning, and restoration of OG501B. Additional testing to assure the reliability of the Operable diesel generators is also proposed (see Compensatory Action 2. below). Please note that the proposed changes will expire when the LCO is restored, but no later than September 14, 1990.

Marked-up and typed revisions of the proposed changes are attached. Please note that these pages already reflect the diesel generator testing changes previously approved under your April 4, 1990 waiver of compliance.



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.

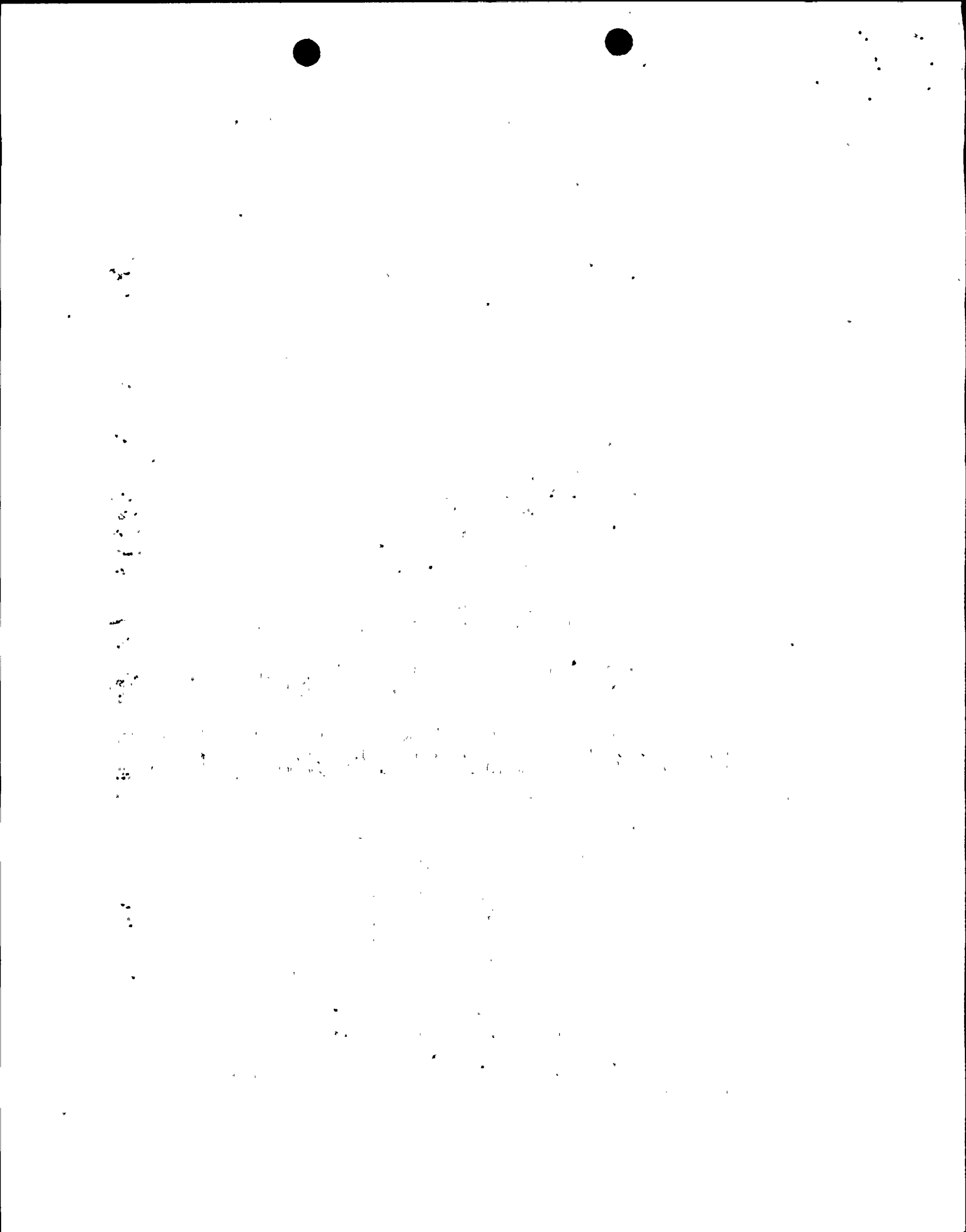
The following additional compensatory measures will also be performed in support of the extended action time:

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 RHRW), 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).

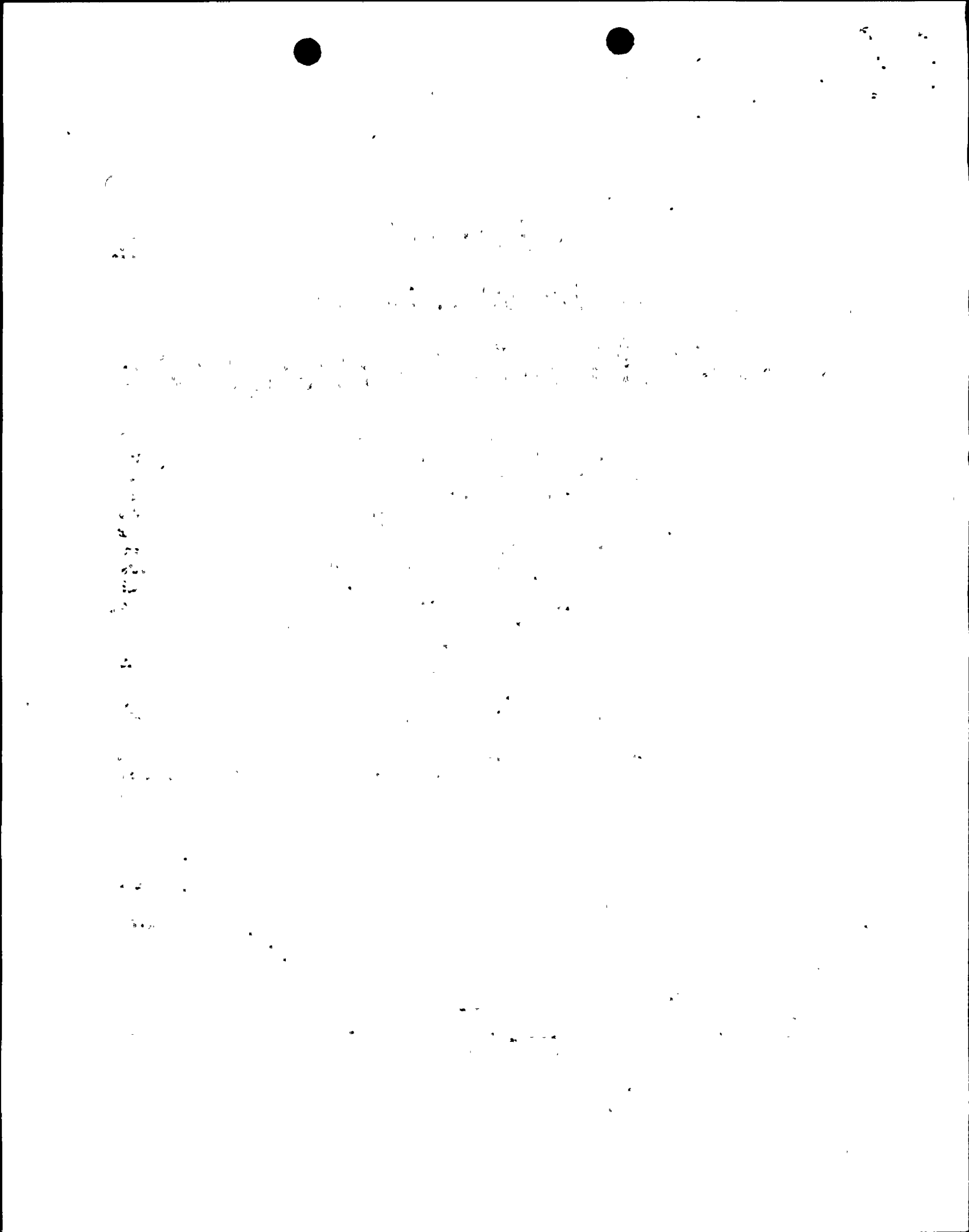
The value of 1.4×10^{-8} /year is based on the IPE evaluation of the affect of opening the spray pond bypass valve for both divisions. The value of 7.0×10^{-8} /year is based on the IPE evaluation of the current diesel generator configuration. The evaluation of this equation for the 72-hour action time results in an annual risk for total plant damage of 1.45×10^{-8} . For 15 days, the result is 1.63×10^{-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 (2.1×10^{-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. In the unlikely event of a design basis LOCA/LOOP during the extended action time, it is possible to address the safe operation of both units with the three remaining operable Diesel Generators. In the event of a LOOP only, safe shutdown of both units can be achieved with two of the three 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. Based on the above, this does not represent a significant reduction in a margin of safety.

Basis for Emergency Request

10CFR50.91 provides guidance on what information the NRC requires in support of an application for an emergency change.

First it requires the applicant to justify that an emergency exists, i.e., "... failure to act in a timely way would result in derating or shutdown of a nuclear power plant ...". Both Susquehanna units are currently operating under a waiver of compliance that extends the expiration of LCO 3.8.1.1, Action b, to September 6, 1990 at 1200 hours. Restoration of the LCO cannot be accomplished within this time. Therefore, without the proposed change, both Susquehanna units will be required to be shut down.

Secondly, 10CFR50.91 requires a licensee to "... explain why this emergency situation occurred and why it could not avoid this situation ...". PP&L's current belief, as stated earlier, is that the situation occurred due to unanticipated human error during a recent maintenance activity. As soon as the situation was understood, a waiver of compliance was submitted and the appropriate internal processes were begun in support of this application.



THE UNIVERSITY OF CHICAGO
DIVISION OF THE PHYSICAL SCIENCES
DEPARTMENT OF CHEMISTRY

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Environmental Consequences

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.

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

Very truly yours,



H. W. Keiser

Attachments

cc: NRC Document Control Desk (original)
NRC Region I
Mr. M. C. Thadani, NRC Project Manager
Mr. G. Scott Barber, NRC Sr. Resident Inspector - SSES
Mr. T. M. Gerusky - Pennsylvania DER

