



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

February 7, 1991

Docket Nos. 50-277
and 50-278

Mr. Dickinson M. Smith
Senior Vice President - Nuclear
Philadelphia Electric Company
Nuclear Group Headquarters
Correspondence Control Desk
P. O. Box No. 195
Wayne, Pennsylvania 19087-0195

Dear Mr. Smith:

SUBJECT: BACKFIT CLAIM RELATED TO THE STATION BLACKOUT EVALUATION FOR
PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3 (TAC NOS.
79371 AND 79372)

I am responding to your letter of January 8, 1991, in which the Philadelphia Electric Company (PECO) submitted a backfit claim with respect to the U.S. Nuclear Regulatory Commission (NRC) staff's positions used in the evaluation of the licensee's submittals in response to the station blackout (SBO) rule, Section 50.63 of Title 10 of the Code of Federal Regulations (10 CFR 50.63). In this backfit determination letter, I am providing the results of our backfit determination, the bases for the determination, and plans for resolution of this matter.

Previous actions relative to this backfit claim include the following. On August 8, 1990, the staff issued its safety evaluation of the licensee's submittals (of April 17, 1989, and April 3, 1990) in response to 10 CFR 50.63, and requested a revised licensee response on noted items of nonconformance within 60 days. On September 10, 1990, the staff held a public meeting with the licensee to discuss the staff's findings presented in the safety evaluation. In a letter of October 15, 1990, the licensee deferred its response to the safety evaluation until the end of 1990. On January 8, 1991, the licensee submitted its backfit claim.

The Office of Nuclear Reactor Regulation (NRR) staff has fully evaluated the licensee's backfit claim and has not been persuaded to alter the staff's positions used in arriving at its evaluation of the licensee's SBO submittals. The staff has concluded that the staff's positions are consistent with the SBO rule and relevant NRC guidance and has determined that its positions do not constitute backfits as defined in 10 CFR 50.109 and therefore denies the licensee's request for reversal of the staff findings. I have enclosed, as justification for this determination, an analysis for each of the staff's positions discussed in your backfit claim.

Mr. Dickinson M. Smith

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February 7, 1991

Therefore, you are requested to revise your SBO submittals to address the items of nonconformance discussed in the staff's safety evaluation of August 8, 1990, and to provide a schedule for submittal of the revised response within 60 days of the date of this letter. If you choose to appeal this proposed backfit determination, the appeal should be addressed to the Director, NRR, with a copy to the NRC Executive Director for Operations. Alternatively, you may choose to conduct technical discussion with the staff of proposed alternative actions to meet the relevant regulatory requirements outside the provisions of the backfitting process.

If you have any questions, please contact Mr. Gene Y. Suh, NRC Project Manager for the Peach Bottom Atomic Power Station, Units 2 and 3.

Sincerely,

/S/

Steven A. Varga, Director
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
Staff's Backfit Determination
cc w/enclosure:
See next page

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Mr. Dickinson M. Smith

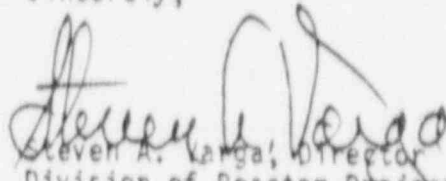
- 2 -

February 7, 1991

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If you have any questions, please contact Mr. Gene Y. Suh, NRC Project Manager for the Peach Bottom Atomic Power Station, Units 2 and 3.

Sincerely,



Steven A. Varga, Director
Division of Reactor Projects - 1/11
Office of Nuclear Reactor Regulation

Enclosure:
Staff's Backfit Determination

cc w/enclosure:
See next page

Mr. Dickinson M. Smith
Philadelphia Electric Company

Peach Bottom Atomic Power Station,
Units 2 and 3

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PLANT-SPECIFIC BACKFIT DETERMINATION REGARDING
STAFF POSITIONS RELATED TO STATION BLACKOUT EVALUATION FOR
PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3

Introduction

In a letter of January 8, 1991, the Philadelphia Electric Company (PECO) submitted a backfit claim with respect to the U.S. Nuclear Regulatory Commission (NRC) staff's positions used in the evaluation of the licensee's submittals in response to the station blackout (SBO) rule, Section 50.63 of Title 10 of the Code of Federal Regulations (10 CFR 50.63). Previous actions relative to this backfit claim include the following. On August 8, 1990, the staff issued its safety evaluation of the licensee's submittals in response to 10 CFR 50.63, and requested a revised licensee response on noted items of nonconformance within 60 days. The licensee's submittals were dated April 17, 1989 and April 3, 1990. On September 10, 1990, the staff held a public meeting with the licensee to discuss the staff's findings presented in the safety evaluation. In a letter of October 15, 1990, the licensee deferred its response to the safety evaluation until the end of 1990. On January 8, 1991, the licensee submitted its backfit claim.

The NRC staff has reviewed the licensee's letter of January 8, 1991, the SBO rule, and the relevant guidance, and concluded that this is a technical issue and that the NRC staff's positions do comply with the rule and guidance, and therefore do not constitute backfits. The guidance considered in our review included the following.

1. Regulatory Guide 1.155, "Station Blackout," June 1988.
2. NUMARC 87-00, "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors," November 20, 1987.
3. NUMARC 87-00, "Supplemental Questions/Answers," December 27, 1989.
4. Regulatory Guide 1.9, Revision 2, "Selection, Design, and Qualification of Diesel-Generator Units Used as Standby (Onsite) Electric Power Systems at Nuclear Power Plants," December 1979.

Discussion

The Peach Bottom Atomic Power Station (PBAPS) is a two-unit station with four emergency diesel generators (EDGs) shared by the two units (Figure 1). The PBAPS updated final safety analysis report (UFSAR) discusses the ability to safely shut down both units assuming operation of three of the four EDGs during a station-wide loss of offsite power (LOOP) event and a concurrent design basis loss of coolant accident (LOCA) at one unit. The UFSAR does not include an analysis to determine the minimum number of EDGs required to safely shut down both units during a station-wide LOOP event without a concurrent LOCA at one unit. The licensee claims that two EDGs are sufficient, whereas the NRC staff has determined that three EDGs are required. The rule and the

related guidance did not specifically address the EDG configuration at the PBAPS or at many other plants. However, the staff subsequently developed guidance on acceptable implementation of the rule on many important issues (for example, qualification of EDGs as alternate ac (AAC) power sources on the basis of excess capacity). This information was provided to the Industry (NUMARC) and discussed in detail in a meeting on April 25, 1990, at the management level. This information was also discussed with the licensee in a meeting September 10, 1990. The staff has applied this guidance uniformly in its reviews of SBO responses, and has resolved many issues in this manner. The staff continues to conclude that this guidance constitutes implementation of the SBO rule and not new requirements.

The licensee has identified the following five areas where it claims the staff has positions that are inconsistent with or go beyond the SBO rule as it relates to the PBAPS.

Licensee Position 1

Two completely shared EDGs comprise the minimum number of emergency ac (EAC) power sources needed to shut down both units during a loss of offsite power (LOOP) event, rather than three EDGs. Because of the asymmetry of the EDG loading, a reasonable number and type of operator actions are needed to connect certain safe shutdown equipment to the EAC power source.

Response to Position 1

The UFSAR does not analyze the minimum number of EDGs required to safely shut down the plant for a LOOP condition without a concurrent LOCA at one unit. Thus, the UFSAR condition analyzed (LOOP event with concurrent LOCA at one unit), which presumably envelops the LOOP only condition, should be considered as the design basis for a LOOP condition without a concurrent LOCA. The staff reaches the same conclusion based on an analysis of the loads required for responding to a LOOP only condition. These loads (totaling 5972 kW for both units (2 EDGs) or 2986 kW for a single EDG) were listed in Table 1 of the licensee's April 3, 1990, submittal. This 2986 kW load for one EDG exceeds the 2000-hour (2840 kW) rating and also the continuous (2600 kW) rating of the EDGs. In addition, the NRC staff's consultant, Science Applications International Corporation (SAIC), documented a number of significant discrepancies between the LOOP safe shutdown loads identified by the licensee and those listed in the plant UFSAR. This discrepancy in LOOP loads for the site is 1233 kW (See SAIC TER attached to the NRC staff's safety evaluation of August 8, 1990.), and which, when added to the licensee's identified loads (5972 kW) would exceed the combined 30 minute ratings of the two EDGs (7205 kW load vs. the combined 30-minute rating of 6500 kW for two EDGs).

The NRC staff's position is that the qualification of EDGs for use as AAC sources should not be attained by load shedding, which results in a

degradation of their normally available safe shutdown capability for the LOOP condition. The staff considers actions that would significantly add to the burden of operators, who are already in a high stress environment, to be a degradation of normal safe shutdown capability for a LOOP event. Such actions include load switching or the disabling of information displays or alarms in the control room.

The asymmetry of the safe shutdown loads on each 4 kV emergency bus may prevent the connection of any two EDGs so as to power all of the needed LOOP safe shutdown loads for both units. In addition, the existing EDG configuration provides connectibility of each EDG to only one of the four safety buses in each unit. Thus, this limitation of connectibility may prevent any two buses from providing the design complement of loads for LOOP safe shutdown. Therefore, the staff concludes that three EDGs (instead of two) are needed to power the LOOP shutdown loads for both units and four EDGs meet only the minimum redundancy requirements. Therefore, the PBAPS configuration contains no excess redundancy for permitting the use of one of the existing four EDGs as an AAC power source.

Licensee Position 2

The minimum redundancy requirement is satisfied by three EDGs, rather than four EDGs, because only two EAC EDGs are required to power safe shutdown equipment for both units during a LOOP event, and only one additional EDG meets the minimum redundancy requirement. Therefore, the PBAPS EDGs are categorized as a two-out-of-three EAC configuration, which results in an 8-hour coping duration for an SBO event, rather than a two-out-of-four EAC configuration, which would result in a 4-hour SBO duration.

Response to Position 2

As indicated above, the staff has not been convinced by the licensee's information that two EDGs are sufficient for LOOP on both units. Therefore the staff cannot agree with the licensee's proposed categorization.

Licensee Position 3

Depending upon the particular EDG combination serving as the EAC power sources, the loading of a single EDG may be within its 200-hour rating rather than its 2000 hour or continuous rating for anticipated operational occurrences such as a LOOP event.

The use of the 200-hour EDG rating for determining that necessary safe shutdown loads can be powered during a LOOP event, rather than the 2000-hour or continuous rating, does not mean that the EDG will fail during or at the end of the 200-hour period, and is therefore reasonable.

Response to Position 3

In Regulatory Guide 1.9 (Revision 2), Position C.1 on EDGs calls for the EAC system to be designed based on the full load rating of the EDGs and does not permit the loading of the EDGs beyond the 10-percent overload rating (equivalent to the 2000-hour rating). This is essentially the same as Safety Guide 9, dated March 10, 1971, which was used in the licensing basis for the PBAPS for the LOOP event with a concurrent design basis LOCA. The licensing basis for a LOOP event without a concurrent LOCA should not have a lower standard. The use of the 200-hour rating would place unusual stress on an EDG that is already in a serious situation potentially jeopardizing its continued operation. Furthermore, the reliability assessment of the EDGs for the SBO rule (or in general) is based on periodic testing of the EDGs at the continuous load (100-percent rating or less). Therefore, the EDG reliability so determined would not be valid for actual loading at the 200-hour rating, and periodic testing at this load level would not be found acceptable for obvious reasons.

Licensee Position 4

The number of operator actions needed to safely shut down both units during a LOOP event using two EDGs as the EAC power sources is not inordinate nor unreasonable in scope and timing. The operators' action for a LOOP event will be included in procedures as is done for the fire protection rule.

Response to Position 4

While the rule has been interpreted to allow some operator action given a station blackout has occurred on a unit, it is inappropriate to take credit for operator actions to reduce load on EDGs when establishing the EAC category per the regulatory guide and for qualifying an EDG as an AAC source. No such provision was made for operator actions in the rule or associated guidance. This issue was discussed with the Industry at length after the staff position had been provided to Industry (NUMARC). Qualifying an EDG as an AAC source or establishing the EAC redundancy is determined by the number of EDGs required to power the complete contingent of safety related and non-safety related loads normally expected to be available in a LOOP condition and should not be obtained by operator action. Operator actions, not presently required for the LOOP scenario, increase the chance for error and could add to the likelihood of an SBO. Thus, taking credit for the redundancy obtained by operator action is not appropriate without imposing any penalty for the operator actions required.

Licensee Position 5

The additional loads identified by the NRC in its safety evaluation and supporting technical evaluation report are associated with either the equipment needed to mitigate the consequences of design basis accidents or other equipment that has not, under the current PBAPS licensing basis, previously been required to maintain safe shutdown. Without these additional loads, the EAC loads do not exceed the EDG's 200-hour rating.

Response to Position 5

The loads used by the staff in its analysis are consistent with the LOOP loads used by other plants. There are no unique differences associated with the PBAPS. Because the UFSAR does not identify the loads for a LOOP event without a concurrent LOCA, no licensing basis is provided except for the LOOP event with a concurrent LOCA scenario, which presumably envelops the LOOP-only scenario. Thus, the design basis for a LOOP event without a concurrent LOCA is not explicitly defined. In any event, the licensee's tabulations show that the EDG loading exceeds the EDG 2000-hour ratings of two EDGs for normal LOOP station safe shutdown. In addition, the licensee's tabulations show the EDG loading for SBO safe shutdown exceeds the EDG 2000-hour rating of one EDG when the EDG is serving as the AAC power source.

In addition to presenting these five licensee positions in its backfit claim, the licensee stated that the NRC staff has stated that under SBO conditions, one unit must be assumed to be blacked-out and one unit must be assumed to be experiencing a LOOP event, but is not blacked-out. This is the staff position for plants using an EDG's excess capacity. However, this issue is not relevant for the PBAPS, because the licensee claims excess redundancy rather than excess capacity. The staff has concluded that the PBAPS does not have excess EDG capacity or redundancy.

Conclusion

The staff has evaluated the licensee's claim that the staff's positions go beyond the SBO rule requirements. The staff has, in many cases which are not clearly defined by the rule, applied reasonable interpretations which are consistent with the rule and other guidance and which are consistent with the staff's evaluation of other equally undefined design cases. As described above, this is the case with the PBAPS, and thus these interpretations by the staff do not constitute backfits, but merely apply the rule and associated guidance to different designs in a reasonable and consistent manner.

Attachment: Figure 1, PBAPS One Line Diagram

Dated: February 7, 1991

PBAPS STATION ONE LINE DIAGRAM

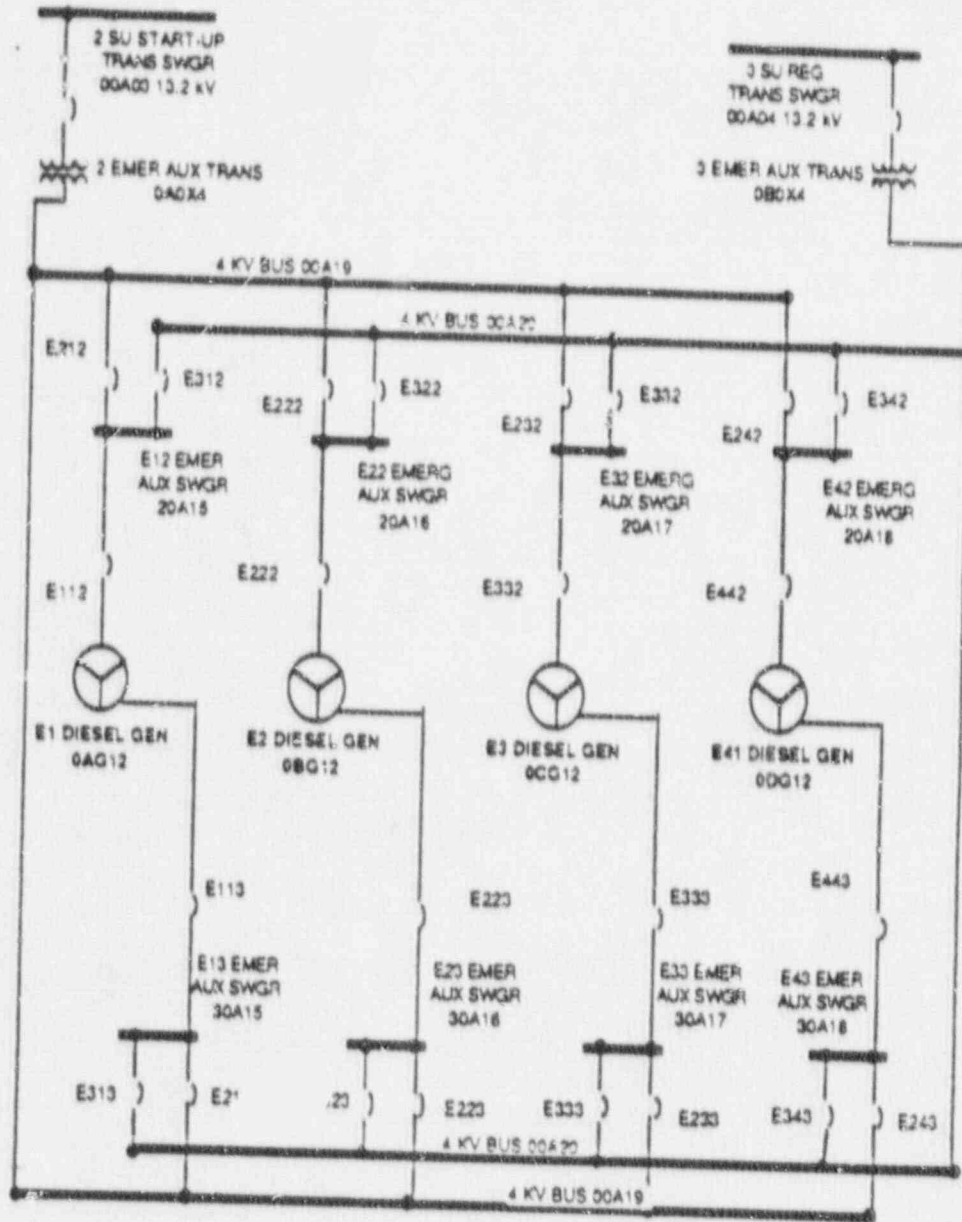


Figure 1

(This is Figure 1 from PECO's April 1989 submittal.)