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DAVID R. HELWIG
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January 8, 1991

Docket Nos. 50-277
50-278

License Nos. DPR-44
DPR-56

Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: Peach Bottom Atomic Power Station, Units 2 and 3
10CFR50.63, "Loss of All Alternating Current Power"
Response to NRC Safety Evaluation and Claim of Backfit

Dear Dr. Murley:

The purpose of this letter is to submit our claim that the NRC positions used to determine that Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3, do not comply with the station blackout (SBO) rule, 10CFR50.63, constitute backfits as defined in 10CFR50.109(a)(1). Since we consider these NRC positions to be backfits, we request that the NRC rejection of our response to the SBO rule for PBAPS, Units 2 and 3, be reversed.

As detailed in the attachment to this letter (which also provides additional background information), the NRC positions in question were provided in the NRC Safety Evaluation (SE), transmitted by letter dated August 8, 1990, and during a meeting with the NRC reviewers held on September 10, 1990 (documented in the NRC meeting summary dated November 6, 1990). Specifically, the NRC conclusion, stated in its August 8, 1990 letter, is that the existing Emergency Diesel Generators (EDGs) at PBAPS, Units 2 and 3, ". . . do not meet the excess redundancy requirement that would permit them to qualify as alternate AC (AAC) power sources under the SBO rule. . . ." As a result of that conclusion, the August 8, 1990 NRC letter states that ". . . a separate AAC source must be added or a re-analysis should be conducted to show that the plant can cope with an SBO for the required duration without an AAC source. . . ."

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We consider, for the reasons summarized below, that the NRC's conclusion is based on positions which are inconsistent with or go beyond the requirements of the SBO rule. The SBO rule provides that at multi-unit sites (such as PBAPS), existing EDGs may be used as AAC power sources where the combination of emergency AC (EAC) power sources exceeds the minimum redundancy requirement (i.e., single failure criterion) for non-design basis accident safe shutdown of all units. We have determined, in conformance with NRC accepted SBO rule guidance, that the combination of the existing four EDGs at PBAPS (which are completely shared between Units 2 and 3), exceeds the SBO rule minimum redundancy requirement and therefore, any one of the four EDGs meets the SBO rule requirements for an AAC power source.

The NRC's conclusion to the contrary is based on positions which, with respect to the EDG configuration at PBAPS, are not required by the SBO rule or included in NRC guidance. The issues involved in these positions include the following.

- o Two completely shared EDGs comprise the minimum number of EAC power sources needed to shut down both units during a Loss of Offsite Power (LOOP) event, rather than the three EDGs required to shutdown both units during a concurrent LOOP event and design basis accident at one unit.
- o The minimum redundancy requirement is satisfied by one EDG, rather than two, since both of the two EAC EDGs power safe shutdown equipment for both units during a LOOP event. Therefore, the PBAPS EDGs are categorized as a two-out-of-three EAC configuration, resulting in an 8-hour coping duration for an SBO event, rather than a two-out-of-four EDG category which would result in a four hour SBO duration.
- o 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.
- o A reasonable number and type of operator actions can be credited in evaluating the station staff's response to an anticipated operational occurrence, and the acceptability of these operator actions can not be based on a comparison to the more limited scope of operator actions allowed to be taken during a design basis accident.

As explained in the attachment, we consider that the NRC's rejection of the SBO analysis for PBAPS, Units 2 and 3, is based on positions which go beyond the requirements of the SBO rule and are technically unjustified. Accordingly, we request that the NRC's rejection be reversed.

If you have any questions or require additional information, please contact us.

Very truly yours,



Attachment

cc:	J. M. Taylor, Executive Director for Operations, USNRC	w/ attachment
	E. L. Jordan, Director, Office for Analysis and Evaluation of Operational Data, USNRC	"
	J. G. Partlow, Associate Director for Projects, USNRC	"
	W. T. Russell, Associate Director for Inspection and Technical Assessment, USNRC	"
	T. T. Martin, Administrator, Region I, USNRC	"
	J. J. Lyash, USNRC Senior Resident Inspector, PBAPS	"

ATTACHMENT

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 and 3 STATION BLACKOUT Response to NRC Safety Evaluation and Claim of Backfit

By letter dated August 8, 1990, the NRC transmitted its Safety Evaluation (SE) and Technical Evaluation Report (TER) related to our response to 10CFR50.63 (i.e., the station blackout (SBO) rule) for the Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3. The August 8, 1990 NRC letter stated that PBAPS, Units 2 and 3, do not comply with the SBO rule, and that a revised response should be submitted. At our request, a meeting was held between representatives of Philadelphia Electric Company (PECO) and the NRC on September 10, 1990 to discuss the issues and additional information requests specified in the NRC SE and TER. By letter dated October 15, 1990, we submitted an interim response to the NRC SE stating that as a result of the NRC clarifications and positions provided in the NRC SE and during the September 10, 1990 meeting, we would re-evaluate the SBO rule response for PBAPS, Units 2 and 3. We further committed to assess various options and submit the description and schedule of the selected option by December 31, 1990.

After further evaluation, we have concluded that PBAPS, Units 2 and 3, do comply with the SBO rule, as described in our letters dated April 17, 1989 and April 3, 1990. We further find that the positions cited in the NRC SE and during the September 10, 1990 meeting to support the NRC conclusion that PBAPS, Units 2 and 3 do not comply with the SBO rule, constitute backfits as defined in 10CFR50.109 since these positions go beyond the requirements of the SBO rule, and therefore are technically unjustified since conformance with these positions is not necessary in order for PBAPS to comply with the SBO rule nor to ensure adequate protection of the public health and safety. Accordingly, in accordance with NRC Manual Chapter 0514 and NUREG-1409, "Backfitting Guidelines," section 2.5, we are submitting this backfit claim to you, the Director, Office of Nuclear Reactor Regulation, with a copy to the NRC Executive Director for Operations and the Director, Office for Analysis and Evaluation of Operational Data, and request that the NRC rejection of our PBAPS SBO analysis be reversed.

BACKGROUND

PBAPS is a two unit station with four (4) Emergency Diesel Generators (EDGs) that are completely shared between both units. That is, when called upon to perform its safety function, each EDG starts and loads a safeguard electrical bus from each unit. Consequently, certain equipment required to safely shut down both units, and maintain both units in a safe shutdown condition, are powered by each EDG. Furthermore, different safe shutdown equipment for both units is loaded on a particular safeguard electrical bus. For example, EDG 2 is capable of powering various safe shutdown equipment such as a Unit 2 Residual Heat Removal (RHR) pump or a Unit 3 RHR pump, and a common Emergency Service Water (ESW) pump. Clearly, then, emergency AC power provided by the EDGs during anticipated operational occurrences as well as design basis accidents can only be considered on a "station" basis, not on a "per unit" basis. Accordingly, we found that the EDG loading configuration at PBAPS, Units 2 and 3, provides additional flexibility in the station response to a Loss of Offsite Power (LOOP) or SBO event than would be the case with two dedicated EDGs per unit. As a result, we attempted to pursue the NRC policy reflected in the SBO rule Statement of Consideration that ". . . the door is open to licensees who believe their plants have additional [SBO] capability that should be considered by the [NRC] staff in demonstrating compliance with the rule."

In determining the Emergency AC (EAC) power supplies for PBAPS, Units 2 and 3 (i.e., the minimum number of EDGs needed to safely shutdown both units in the event of a LOOP), we followed the steps in parts 2.A, 2.B, and 2.C of the Nuclear Management and Resources Council's (NUMARC's) guidance document NUMARC-8700, "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors." We concluded that any two of the four EDGs were capable of powering the necessary safe shutdown equipment for both units based on the following considerations.

- o Only equipment required to safely shutdown and maintain both units shutdown during a LOOP event of extended duration must be capable of being powered by the EAC power sources. The capability to simultaneously power additional equipment which is specifically needed to mitigate the consequences of a design basis accident (e.g., Loss of Coolant Accident (LOCA)) does not need to be considered.
- o Due to the asymmetry of the EDG loading described above, a reasonable number and type of operator actions were needed to connect certain safe shutdown equipment to the EAC power sources.
- o 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. The current licensing basis for the EDGs at PBAPS, Units 2 and 3, includes conformance to a proposed IEEE standard, "Proposed IEEE Criteria for Class 1E Electrical Systems for Nuclear Power Generating Stations," dated June 1969, and partial conformance to Atomic Energy Commission (AEC) Safety Guide 9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," dated March 10, 1971. Neither of these licensing basis documents nor the PBAPS Updated Final Safety Analysis Report (UFSAR) commits us to maintain the PBAPS EDG loading within the 2000-hour or continuous rating for anticipated operational occurrences such as a LOOP event.

Given that a LOOP event would, as designed, result in the powering of certain safe shutdown equipment for both units by a minimum of two shared EDGs, we concluded that a third EDG satisfies the requirement to account for minimum redundancy of the EAC power sources. This conclusion is based on the fact that the third EDG satisfies the single failure criterion. That is, since two shared EDGs are needed to safely shutdown both units in the event of a LOOP, a third EDG, which by design would power certain safe shutdown equipment for both units, satisfies the minimum redundancy requirement assuming a failure of one of the two EAC EDGs.

In accordance with the SBO rule, where the combination of EAC power sources exceeds the minimum redundancy requirements for non-design basis accident safe shutdown of both units, the remaining EDG (in this case, the fourth EDG) may be used as the Alternate AC (AAC) power source provided it meets the AAC power source requirements. On this basis, we concluded that one of the four existing EDGs could serve as the AAC power source during a SBO event. We should point out here that in the event of a SBO, i.e., a station-wide LOOP event and the loss of three EDGs which constitute the EAC power sources, the remaining AAC EDG will, by design, start and load certain safe shutdown equipment for both units. Since certain safe shutdown equipment will be powered and other safe shutdown equipment will not automatically be powered for both units, the determination of which unit is blacked-out and which unit is not blacked-out is not possible. Accordingly, we conservatively assumed that the SBO event affects both units at the same time.

The NRC SE and supporting TER, along with information provided by the NRC during the September 10, 1990 meeting, provided the following positions for the NRC's conclusion that PBAPS, Units 2 and 3, do not comply with the requirements of the SBO rule as it pertains to the AAC power source definition. As explained below, we consider these positions to constitute backfits in that these positions go beyond the requirements of the SBO rule and are technically unjustified.

BACKFIT DISCUSSION

NRC Position

The NRC relied on the fact that current PBAPS licensing basis (i.e., the UFSAR) shows that the EAC power sources are comprised of three EDGs, that is, three of the four EDGs are required to safely shut down both units during a LOOP event.

PECo Position

The UFSAR provides a safety analysis to show that there is a sufficient number of EDGs, assuming a single failure, for the most limiting fault (i.e., design basis accident). Accordingly, the UFSAR discussed the ability to safely shutdown both units assuming operation of three of the four EDGs during a station-wide LOOP event and a concurrent LOCA at one unit. The UFSAR does not currently include an analysis to determine the minimum number of EDGs required to safely shut down both units during an anticipated operational occurrence such as a LOOP event. The EAC evaluation performed in conformance with the SBO rule requirements (i.e., the EAC power source must be capable of powering non-design basis accident safe shutdown loads) shows that two EDGs can safely shut down both units during a LOOP event, accounting for reasonable operator actions. Accordingly, since the SBO rule explicitly excludes consideration of a concurrent LOOP event and a design basis accident, the UFSAR safety analysis can not be used to support the conclusion that operation of three of the four EDGs is necessary for safe shutdown of both units during a LOOP event.

NRC Position

The NRC concluded that two EDGs in addition to the two EDGs which serve as the EAC power sources, are required to satisfy the minimum redundancy requirements. Therefore, the EAC EDG category is two-out-of-four.

PECo Position

As discussed above, the two EDGs which serve as the EAC power sources can not be considered as powering safe shutdown equipment on a per unit basis because safe shutdown loads for both units are powered by both EAC EDGs. This is clearly different from a two unit station with two dedicated EDGs per unit (that is, safe shutdown equipment for each unit is clearly associated with two EDGs). In such a case, based on the design whereby one EDG dedicated to each unit powers all the safe shutdown equipment for that unit, the second EDG dedicated to each unit satisfies the minimum redundancy requirements. Since safe shutdown loads at PBAPS, Units 2 and 3, are not dedicated to certain EDGs, and two EDGs serve as the EAC power sources for both units, then one additional EDG meets the minimum redundancy requirements.

Therefore, in accordance with steps 2.A, 2.B, and 2.C of NUMARC-8700, the EAC EDG category for PBAPS, Units 2 and 3, is two-out-of-three. Note that one EDG, the AAC power source, has been subtracted from the total number of EDGs in accordance with NUMARC-8700, so as not to double count this EDG as both an EAC and AAC power source. In this way, PBAPS is categorized as an eight (8) hour coping duration station. If the EAC EDG configuration is changed to two-out-of-four, then PBAPS, Units 2 and 3, would be classified in the less conservative four (4) hour coping duration category.

NRC Position

The NRC has taken the position that in determining the number of EDGs which comprise the EAC power sources, only the 2000-hour or continuous EDG rating can be used.

PECo Position

The NRC position that only the 2000-hour or continuous rating can be used in evaluating the EAC power sources was not previously specified in the SBO rule and accompanying Statement of Consideration, Regulatory Guide 1.155, "Station Blackout," dated August 1988, or NUMARC-8700. Furthermore, as stated above, the current licensing basis for PBAPS, Units 2 and 3, does not limit EDG loads to the 2000-hour or continuous rating for anticipated operational occurrences such as a LOOP event (i.e., UFSAR Section 8.5). Operating an EDG loaded to its 200-hour rating for 200 hours, approximately one week's time, would not, according to the EDG vendor, result in its failure during or at the end of this period, but would only require more extensive preventive maintenance. Furthermore, even assuming the highly improbable occurrence of a LOOP event which lasted for one week, plant operators would manually add and trip appropriate loads, as described in UFSAR section 8.5.3, so as to reduce EDG loads below the 200-hour rating. Therefore, we consider that use of the 200-hour EDG rating for LOOP event loads is reasonable and within the current PBAPS licensing basis. Accordingly, this NRC position appears to impose a new requirement on the accepted PBAPS licensing basis and goes beyond the requirements of the SBO rule.

NRC Position

The NRC stated that additional loads needed to safely shut down both units, such as the Control Rod Drive (CRD) pumps and Standby Gas Treatment System (SGTS) exhaust heater, were not included in the tabulation of loads required to be powered by the EAC power sources during a LOOP event. These additional loads would exceed the EDG 200-hour rating.

PECo Positions

The additional loads identified by the NRC in its SE and supporting TER are associated with equipment needed to either 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, and are not automatically connected to the EDGs. Since the SBO rule and guidance specifically excludes consideration of design basis accidents in determining the EAC power sources, and these additional loads would not need to be stripped from the EDGs since they are not automatically loaded during a LOOP event, the NRC identified additional loads should not be added to the LOOP shutdown load tabulation. Therefore, EAC loads do not exceed the 200-hour EDG rating.

NRC Position

The NRC 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.

PECo Position

As discussed above, for any LOOP event at PBAPS, Units 2 and 3, where at least one EDG starts and loads its associated safeguard electrical bus, certain safe shutdown equipment at both units will be automatically powered while other safe shutdown equipment for both units will only be powered after specified manual operator actions are taken. Therefore, a blacked-out unit and a non-blacked out unit cannot be distinguished. For this reason, our SBO analysis for PBAPS, Units 2 and 3, conservatively assumes that both units are blacked-out. This is different from the case of a two unit station with two dedicated EDGs per unit. In this case, the unit at which the redundant EAC power sources are assumed to be lost during a LOOP event is clearly the blacked-out unit.

NRC Position

The NRC stated that an inordinate number of operator actions, such as switching one RHR pump between units, is not acceptable in determining the EAC power sources.

PECo Position

Taking credit for operator actions in determining the EAC power sources was recognized as acceptable in the Statement of Consideration accompanying the SBO rule (NRC response to comment no.13, 53PR23211). As part of our determination that any two EDGs could serve as the EAC power sources, we identified the operator actions that would be performed to power other safe shutdown equipment from any combination of two EDGs. We then walked through these actions with licensed operators and found them to be reasonable, both in number and scope, and with respect to the time within which certain actions must be taken. Additionally, as stated in our April 3, 1990 letter, operators would not need to switch an RHR pump between units in order to achieve and maintain safe shutdown of both units during a LOOP event, even though switching of an RHR pump between units is already identified as operator actions taken during a certain abnormal operational transient in our licensing basis (i.e., UFSAR section 14.5.7). Therefore, we have concluded that the number of operator actions needed to safely shutdown both units during a LOOP event using two EDGs as the EAC power sources is not inordinate nor unreasonable in scope and timing. Furthermore, we consider that a comparison of the operator actions that would be taken during an anticipated operational occurrence such as a LOOP event with the operator actions that would be taken in the event of a design basis accident is not valid, given that the range of operator actions that have been found acceptable to achieve and maintain plant safe shutdown in accordance with 10CFR50.48, "Fire Protection," is significantly broader than those operator actions that are accounted for in mitigating a LOCA. This comparison of the SBO rule with the fire protection rule is appropriate based on the discussion in the SBO rule Statement of Consideration that the SBO rule ". . .should be viewed as being in the same accident prevention context as . . .the fire protection rule (50.48). . ." In any event, we intend to pursue the procedural changes necessary to incorporate the identified operator actions for a LOOP event since preliminary findings of the Probabilistic

Risk Assessment (PRA) being performed for PBAPS, Units 2 and 3, shows that proceduralizing the identified operator actions results in a substantial reduction in the contribution of LOOP events, including an SBO event, to the overall core damage frequency for PBAPS, Units 2 and 3.

For the reasons explained above, we consider that the NRC rejection of SBO analysis for PBAPS, Units 2 and 3, is based on positions that go beyond the SBO rule requirements and are technically unjustified. Accordingly, we request that the NRC rejection of the PBAPS SBO analysis be reversed.