TO: E.Weiss, S/C, EELB 21 September 1993

FROM: C. Morris, EELB

SUBJECT: Catawba Breaker Coordination (TAC M86367,-8)

INTRODUCTION

An EDSFI at Catawba Nuclear Station (CNS) on 18 March '93, found that 125 V dc instrument and control (I/C) breakers were not in conformance with the CNS FSAR in that they were not coordinated. 600 V ac breakers feeding the 125 V dc I/C system (EPL) battery chargers were also not coordinated.

CNS proposes to revise the FSAR and not to modify the breakers because CNS says:

1. The probability of a 3-phase branch circuit fault that could trip the upstream breaker first is low.

2. The cost of making modifications would be too high for the benefits resulting.

3. The other redundant, independent safety train would perform the needed safety functions, if one train were disabled by a branch circuit fault.

The reviewer, C.Morris (CM), wrote a safety evaluation (SE) and submitted it on 18 August 1993 to his S/C, E. Weiss (EW). In the SE, CM said:

1. The staff cannot accept a continuing failure to coordinate safety breakers because of associated costs to the licensee, because:

   1.1 Redundant safety trains are required to meet the single failure criterion and are part of the defense-in-depth against random operational failures. Redundant safety trains cannot be used to excuse known design deficiencies.

   1.2 GDC-1 requires: "Structures, systems and components important to safety shall be designed, fabricated, erected and tested to quality standards commensurate with the importance of the safety functions to be performed." The 125 V dc, I/C power supply is essential to the operation of the plant in all modes and most especially in upset condition. Since even ordinary commercial practice requires breaker coordination, at least as much is required by GDC-1 for the CNS EPL.

1.3 CNS stated that the probability was low that a 3-phase fault would occur where it could cause a safety breaker feeding a bus load of safety loads to trip before the branch circuit breaker. CNS offered no supporting analysis for this estimate, nor even what they meant by low.

1.4 The cost to a licensee of performing to an FSAR commitment is not a factor the staff should consider. Once a No Significant Hazards determination has been made by the licensee and has been accepted by the staff, the licensee is free to select the most economical course to follow.

PURPOSE

The purpose of this memorandum is to confirm instructions from EW on how to proceed. In response to EW instructions to find out how others might have resolved similar coordination problems, CM spoke to project managers for ten nuclear power plants at which EDSFI, in 1991 and 1992, found uncoordinated breakers. Some plants had made the necessary breaker changes; others have deferred resolving the breaker coordination issue. CNS appears to be the first plant to argue that they need not change their breakers and would instead change their FSAR.

Thus, as EW has been told several times by CM, a policy decision is needed. There appears to be no single, clear criterion to use to assess the licensee's proposal. Rather, the various considerations listed below weigh on the matter; a Solomon is needed. If he is not to be found in EELB, where is he?

Also, because the management of EELB has signally expressed dissatisfaction with CM's productivity, it is necessary to record the basis for the additional hours being expended on this SE. A draft was submitted, on 18 August 1993, to EW for comment. In addition to remarks not directly bearing on the need for action on the CNS proposal, EW said that a technical analysis was needed. Part of the reason for this memorandum is to show why a technical analysis of whatever kind, and it was unspecified by EW, except that it should have a list of safety loads that would be lost, will probably not be sufficient.

Further, on an earlier occasion, C. Berlinger, B/C said that he had been warned that CM had a penchant for taking a simple issue and making a big thing out of it. Some of the considerations that make a big thing out of CNS's proposal are given below, for the benefit of those who might not think of some of them for themselves.

CONSIDERATIONS

Further considerations relating to the reviewer's decision to deny the licensee the relief he asked for follow.

1. Nowhere in 10 CFR 50, in regulatory guides, or in industry standards can be found a requirement stating that nuclear plant circuit breakers must be coordinated over the entire available current range, and at all times. Instead, language that has been interpreted by the staff to mean that some kind of protection against propagating faults is desirable can be found, in some standards, as in IEEE Std 308, Section 5.3.1(6),to wit: "Protective devices shall be provided to limit the degradation of the Class 1E power systems."

2. 10 CFR 50 APP. A says that multiple failures induced by a single failure count as a single failure. Then, in this case, the licensee could claim that the failure of a safety bus, as a result of a single failure in one branch circuit of the same bus was, in fact, the single failure of the design basis and, therefore, that they need not coordinate the bus feeder breaker with the bus branch circuit breakers. This is one of the licensee's positions which he restated during the telephone conference on 15 Sept. 1993.

3. Because of 1. and 2., immediately above, the staff would seem to be in a weak position, if the staff were to try to require CNS to coordinate the breakers that were found by the EDSFI to be not in compliance with the Catawba FSAR.

4. But, if the staff were to accept the CNS position, the NRC should expect a blizzard of similar proposals to not coordinate safety breakers, whenever a redundant safety train is available. This is perhaps, the most important objection to accepting the CNS proposal.

5. Requiring CNS to perform to their FSAR commitments would not be a backfit because, as stated in 10 CFR 50.109 (a)(4), "The provisions of paragraphs (a)(2) and (a)(3) of this section are inapplicable and, therefore, backfit analysis is not required and the standards in paragraph (a)(3) of this section do not apply where the ... staff... finds ... with appropriated [sic] documented evaluation for its finding, either: (i) That a modification is necessary to bring a facility into compliance with ... written commitments by the licensee; or...."

On 18 Aug '93, EW said that the SE submitted to him for his comments needed a technical analysis; that the SE was legalistic and mere regurgitation. He said further that the licensee would resist an NRC order to coordinate the breakers, and that to do so the NRC would have to enter a space, which EW apparently found real, called "compliance backfit space", but which is not to be found in 10 CFR 50.109. EW wanted a list of loads that would be lost, if a 3-phase fault occurred on a branch circuit. In pursuit of that objective, CM arranged a telephone conference with CNS. The principle benefit of the conference was the licensee's promise to send to the staff a list of loads that would be lost if the EPL breakers were uncoordinated.

When the list from CNS arrives, (its contents could be extracted from the one line electrical drawings in the FSAR by any one with acute enough vision), the staff will still be faced with the decision: Which loads lost, because of the potential faults at different locations, could be accepted by the staff, as involving no significant hazards, and which not? No criteria are available to the staff for them to use to so decide, whichever sets of loads are presented by the licensee in his response. EW will surely recall that this question was put to him during his generous assessment of the draft SE. The engineering judgement of the staff, it is to be hoped, will not serve as the only basis for the decision; more is surely needed. A PRA for Oconee exists. If Catawba were sufficiently like Oconee, they are different in age and design, the Oconee PRA might be used to lend support to the CNS NSH determination.

6. 10 CFR 50.92 requires licensees intending to materially alter a licensed facility to make a no significant hazards determination (NSH). And the staff is required to assess the licensee's NSH determination. CNS's statement that the frequency of the initiating event , viz. the 3-phase fault is low, with no other supporting material, hardly qualifies as an NSH determination. Unless the licensee possesses the necessary reliability parameters such a NSH determination requires, it is difficult to see how CNS (or the staff) could make the needed NSH determination.

7. The fact that the alteration has already been made is not a further reason for accepting the state of the plant and changing the FSAR; rather it seems to be a violation of another 10 CFR 50 requirement, viz. Appendix B, Section XVI, which says in part, "Measures shall be established to assure that conditions adverse to quality such as ...deficiencies, deviations...and nonconformances are promptly identified and corrected."

8. EW said of the SE that it was excessively legalistic, itself a legal opinion, of sorts. This does not alter the fact that procedures required by 10 CFR 50 must be followed by the staff, as well as by a licensee seeking to change his facility, or to amend his facility license. Then the staff has no basis for permitting the licensee to change his FSAR, absent a NSH determination, which so far, the licensee has not presented.

9. Notwithstanding the fact that the alteration has already occurred, the staff cannot, with less cause than is required of the licensee, allow him to amend his operating license. Then, until such time as the licensee submits a NSH determination with substance to it that the staff can concur in, CNS is not operating in accord with part of its license.

10. Other licensees have corrected breaker deficiencies by adding fuses to the associated circuits. CNS should be encouraged to explore this alternative before the NRC allows them, (and how many others?), to operate with uncoordinated safety breakers.

CONCLUSION

CM will proceed to list the consequences of uncoordinated breakers, but the accumulation of detail, that is to say, the technical analysis, almost certainly will not provide a basis better than that given in the August 18th SE and will not answer the question: Is the staff to accept licensees' proposals to operate with uncoordinated breakers because two safety trains are provided? And, if not, should the staff establish a precedent at CNS?