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SUBJECT: Memorandum supporting NRC 801212 order that station blackout should be considered as design basis event based on threshold values in SRP.

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING APPEAL BOARD



Administrative Judges:

Richard S. Salzman, Chairman
Dr. W. Reed Johnson

In the Matter of
FLORIDA POWER AND LIGHT COMPANY
(St. Lucie Nuclear Power Plant,
Unit 2)

Docket No. 50-389

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MEMORANDUM

December 22, 1980

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In its order of December 12, 1980, CLI-80-41, 12 NRC the Commission announced that it would review sua sponte the "generic aspects" of ALAB-603, 12 NRC 30 (1980).^{1/} As the order correctly notes (slip opinion at p. 1), in that decision this Board determined that the total loss of on-site and off-site AC power (i.e., station blackout) must be treated as a design basis event for Unit 2 of the St. Lucie nuclear facility. The order goes on to state that this determination had been based upon:

calculations which showed that the probability of station blackout could exceed some threshold values in the Standard Review Plan that are used by the staff to aid in its determination as to whether or not protective measures are needed for certain off-site hazards.

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^{1/} In that same order, the Commission affirmed the license amendments we directed for St. Lucie Unit 2. Slip opinion at p. 3.

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Ibid. On this reading of ALAB-603, the order then sets forth as one of the generic issues the Commission proposes to consider as part of its review of that decision:

What are the generic implications of using the threshold probabilities in Section 2.2.3 of the Standard Review Plan as guidelines in determining the design basis events to be used for plant design and operation?

Slip opinion at p. 3 (footnote omitted).

Although not expressly stated in the order, it may reasonably be inferred that the Commission's characterization of the basis for the finding that station blackout should be considered a design basis event was derived from an interpretation of ALAB-603 contained in the August 22, 1980 memorandum from the Director, Division of Systems and Reliability Research, NRR, to the Director, NRR. (That memorandum was specifically referred to in the order (at p. 2) and seemingly played at least some part in the Commission's decision to review ALAB-603.) We feel constrained to call to the Commission's attention our belief that the Division Director misconstrued the intentions of this Board, with the consequence that the first issue stated in the December 12 order (quoted above) is not presented by ALAB-603.

Specifically, our determination that station blackout must be considered a design basis event was not grounded upon the use of the "threshold probabilities in Section 2.2.3 of the Standard

Review Plan". This is apparent from a collective consideration of Findings 2, 3 and 4 in ALAB-603 (12 NRC at 64):

2. Despite the diverse connections to the grid at Midway and indications that the Florida Power and Light Company is upgrading the reliability of its transmission network, the loss of offsite power at St. Lucie is not a highly improbable event. This circumstance, combined with the fact that the redundant emergency diesels are not themselves highly reliable, leads to the conclusion that a complete loss of AC power -- station blackout -- must be considered a design basis event for St. Lucie Unit 2. In this instance, the single failure criterion does not appear to provide adequate protection of the public health and safety.
3. In the event of a station blackout, a steam driven auxiliary feedwater system can function to provide core cooling and the plant can apparently be maintained in a safe condition for a number of hours in the absence of AC power.
4. There is a high likelihood that following station blackout, a source of AC power can be restored before events resulting from its loss produce reactor core damage or other circumstances injurious to the public health and safety.

Finding 2 stemmed from evidence to the effect that the probability of loss of off-site power would be "at least 0.1 per year" (id. at 44) and that the probability that both diesel generators fail to start on demand would lie in the range of 10^{-3} to 10^{-4} . Id. at 46-48. The combined probability for the

resulting complete loss of AC power was thus determined to lie in the range 10^{-4} to 10^{-5} per year. Id. at 52. It was the very magnitude of these probability values which served as the basis for our ultimate determination in Finding 2 that the station blackout sequence must be considered as a design basis event. The largest of the Standard Review Plan probability values was cited in this discussion of loss of AC power. Ibid. It was, however, our intent there only to provide perspective as to the likelihood of "accidents and other events" which were commonly deemed credible for the purpose of nuclear power plant design.^{2/}

The loss of AC power event does not itself create an accident: Id. at 46. Finding 3 reflects this point, and is based on portions of the record discussed in Section B of ALAB-603. Id. at 52-57.

Finally, Finding 4 is a statement of the acceptability of the St. Lucie plant as designed, based upon the high probability

^{2/} The Standard Review Plan probability values, 10^{-6} to 10^{-7} per year, were mentioned in ALAB-603 in our discussion of an earlier order in this case (ALAB-537, 9 NRC 407, 415-416). There we had posed certain questions to the parties. Recognizing, however, that these values were not intended to encompass such events as a loss of AC power, we looked to them simply as a "starting point" for ascertaining acceptable levels of risk. ALAB-603, 12 NRC at 45. The staff and applicant adopted 10^{-7} per year as a guideline for the analysis of power restoration times. Id. at 46, 58, 60, and 61; see also the discussion of Finding 4 above.

that power can be restored following a station blackout before core damage or other public health and safety consequences result. A discussion of the time to restore AC power, including explicitly an equation presented by the applicant for calculating the probability that AC power not be restored by a certain time following the blackout event, appears in Section C of the decision. Id. at 57-61. In this Section, the probability values of the Standard Review Plan were used to provide guidance as to whether the power restoration times calculated by the applicant and staff were acceptable. Id. at 58 and 60-61.

In conclusion, this Board's determination that station blackout should be considered as a design basis event at St. Lucie Unit 2 hinged upon our independent assessment of the probability of this event as established by the evidentiary record. We used the Standard Review Plan probability values to judge the reasonableness of the time periods within which the witnesses estimated that AC power could be restored.

We are hopeful that the foregoing may be of assistance to the Commission in the conduct of its review of ALAB-603.

FOR THE APPEAL BOARD


Barbara A. Tompkins
Secretary to the
Appeal Board

