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SUBJECT: Forwards addl info requested re anticipated transients w/o scram.

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FEBRUARY 28 1989

L-89-74  
10 CFR 50.62

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
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Gentlemen:

Re: St. Lucie Units 1 and 2  
Docket Nos. 50-335 and 50-389  
Request for Additional Information  
Anticipated Transients Without Scram (ATWS)

By letter dated May 18, 1988 (E. G. Tourigny to W. F. Conway), the NRC requested additional information concerning the Florida Power & Light Company (FPL) plant-specific ATWS Diverse Scram System (DSS) conceptual design, submitted by letter L-87-301 dated July 15, 1987. By letter L-88-343 dated August 15, 1988, FPL provided a partial response to this request for additional information.

Attached is the response to Question 4. This completes FPL's response to this request for additional information.

Should there be further questions, please contact us.

Very truly yours,

*W. F. Conway*  
W. F. Conway  
Senior Vice President - Nuclear

WFC/EJW/gp

Attachment

cc: Malcolm L. Ernst, Acting Regional Administrator, Region II,  
USNRC  
Senior Resident Inspector, USNRC, St. Lucie Plant

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FLORIDA POWER & LIGHT COMPANY  
ST LUCIE PLANT -UNITS 1 & 2  
ATWS - RESPONSE TO NRC QUESTION #4  
BREAKER DIVERSITY

1. Introduction - On July 15, 1987, the Conceptual Design for a Diverse Scram System (DSS) was issued by FPL to describe how FPL was going to meet the requirements of the ATWS Rule, 10CFR50.62, "Requirements for Reduction of Risk from Anticipated Transients Without Scram (ATWS) Events for Light-Water-Cooled Nuclear Power Plants". In the conceptual design, the Control Element Assembly (CEA) Motor-Generator (MG) set output breakers were selected as the final actuating devices for the DSS. By opening both MG set output breakers with a signal from the DSS logic, voltage to the reactor trip switchgear buses and consequently to the CEA drive mechanisms would be removed, causing a Unit shutdown. Both St Lucie - Units 1 and 2 function similarly.

Upon review of the conceptual design, the NRC expressed concern for the degree of diversity between the MG set output breakers and the reactor trip switchgear breakers, prompting FPL to examine that portion of the conceptual design for an alternate method of DSS actuation. This concern was expressed in Question #4 of the NRC Request For Additional Information, May 18, 1988 and is answered herein.

2. Question & Response

Question #4:

Using circuit breakers from different manufacturers is generally not considered sufficient to provide the required diversity for interruption of control rod power. In general, circuit breakers from different manufacturers are considered susceptible to common mode failure (CMF) because of common design features such as mechanical linkage (consisting of springs, pivots, latches, pins, cams, etc.) that are subject to binding/malfunction from a number of causes (e.g., dirt, corrosion, improper lubrication, etc.) as has been demonstrated through operating experience. Please provide information that demonstrates physical hardware diversity of the CEA drive MG set output breakers from the reactor trip breakers actuated by the RPS.

Response:

Due to the NRC's concern for diversity between the reactor trip breakers and the CEA drive MG set output breakers, FPL conducted an investigation of alternate methods for ATWS actuation, including the use of MG set output contactors and interruption of the MG set generator field.

It was determined that interrupting the MG set field was not a satisfactory method of de-energizing the reactor trip switchgear due to output voltage decay rates, potential damage to the MG sets, high residual output voltage after decay, and eventual tripping of the MG set output breakers, (making the output breakers the final actuation devices). The investigation into the use of a contactor installed at the output of each MG set showed that this was a satisfactory method of de-energizing the reactor trip switchgear and met the diversity requirements. Some interlocks between the MG set control circuits and the contactors may be necessary, although there will be no detrimental effects to the reliability of the MG sets or the safety functions of the reactor trip switchgear.

3. Conclusion

FPL proposes as part of their conceptual design, to de-energize the reactor trip switchgear to initiate a diverse scram by opening a load contactor at the output of each MG set. The installation of the contactors will meet the diversity requirement without compromising the functions of the MG sets or the reactor trip switchgear.

4. References

10CFR50.62 Requirements for Reduction in Risk from Anticipated Transients Without Scram (ATWS) Events for Light-Water-Cooled Nuclear Power Plants (ATWS Rule)

FPL letter L-87-301 dated July 15, 1987 Conceptual Design for a Diverse Scram System and the Reactor Trip System/Auxiliary Feedwater Actuation Diversity Study