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SAGER,D.A. Florida Power & Light Co.
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SUBJECT: Forwards summary of testing & test results from study conducted on 891004-06,per integrity assessment program.

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FEBRUARY 19 1990

L-90-59

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Gentlemen:

Re: St. Lucie Unit 1
Docket No. 50-335
Spent Fuel Pool Boraflex Panels
Integrity Assessment Program

By letter L-89-246, dated July 10, 1989, Florida Power & Light Company (FPL) outlined to the NRC its plans to conduct a study program to neutron log or "blackness test" Boraflex panels in Region 1 spent fuel pool cells at St. Lucie Unit 1. By letter dated August 3, 1989 (J. A. Norris to C. O. Woody), the NRC concluded that FPL's proposed study program for blackness testing in Region 1 of the St. Lucie Unit 1 spent fuel pool was acceptable.

The study program described in FPL letter L-89-246 was conducted October 4-6, 1989. On the basis of the tests conducted in accordance with the study program, FPL has concluded that the St. Lucie Unit 1 Region 1 spent fuel cells are performing properly. A summary of the testing and test results is attached.

This concludes FPL's activities with respect to performance demonstrations and integrity assessment testing of the St. Lucie Unit 1 spent fuel pool. If you require further information on this topic, please contact us.

Very truly yours,

D. A. Sager
Vice President
St. Lucie Plant

DAS/EJW/gp

Attachment

cc: Stewart D. Ebneter, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant

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ATTACHMENT

SUMMARY OF BLACKNESS TESTING OF BORAFLEX IN SELECTED CELLS OF THE SPENT FUEL POOL STORAGE RACKS OF ST. LUCIE UNIT 1

Introduction

Neutron logging (blackness) tests were conducted in selected cells of the St. Lucie Unit 1 spent fuel storage racks for the purpose of confirming the integrity of the Boraflex neutron absorber material. These tests were conducted October 4-6, 1989, using a specially designed logging tool containing a Californium-252 neutron source and four boron trifluoride (BF_3) thermal neutron detectors. Calibration traverses were also made in a special test cell constructed with known Boraflex gaps ranging from approximately 0.25 inch to 4 inches in width. These calibration tests demonstrated that gaps of 0.5 inch in width may be readily detected in the blackness tests.

Calibration Testing

A test cell was constructed with known gaps in the Boraflex at specified locations. Figure 1 presents the size and locations of the gaps in the calibration test cell. Based upon the average of several traverses, a calibration curve was developed (Figure 2), relating the peak deflection in the trace at the location of the gap to the size of the known gap. With this calibration curve, the percent deflection observed during the test runs was correlated to a width of gap in the spent fuel pool cell Boraflex panel.

Summary of Test Results

A total of 20 spent fuel cells were tested, of which 15 were designated as test cells intentionally exposed to the radiation from spent fuel removed from the reactor core in the July 1988 refueling. These cells have been exposed to the radiation from one cycle of spent fuel (from July 1988 to October 1989) and the maximum estimated radiation dose to the Boraflex was 1.2×10^{10} RADs. Five cells were also tested in an unirradiated area of the Region 1 storage racks to provide a reference. The blackness tests encompassed 60 full length Boraflex panels in the irradiated test cells and 16 Boraflex panels in the unirradiated area of the storage rack.

The largest indication noted corresponded to a gap of about 0.4 inches in width. A few 0.25 inch deflections were observed in the un-irradiated cells. The deflections which were correlated to gaps on the order of 0.25 inch are at the limit of gap detectability. These indications, therefore, may or may not be indicative of gapping in the Boraflex.

Conclusion

Criticality safety analyses have demonstrated that 0.5 inch gaps are acceptable. On the basis of the measurements, it is concluded that the Boraflex has performed properly, with no gaps equal to or greater than 0.5 inch in the cells tested. These cells are considered representative of the St. Lucie Unit 1 storage racks' cells.

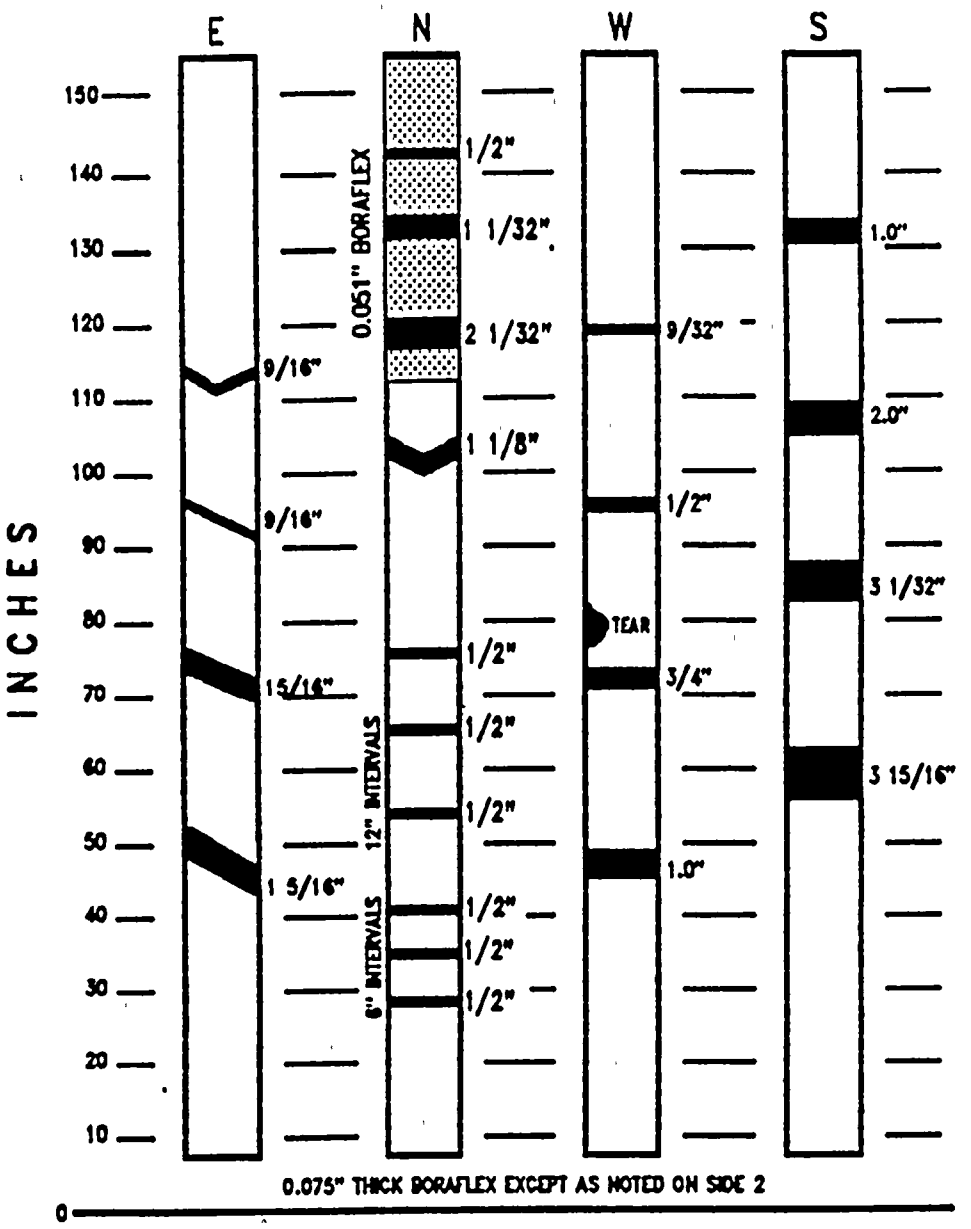

Fig. 1 GAP DISTRIBUTION IN THE CALIBRATION CELL

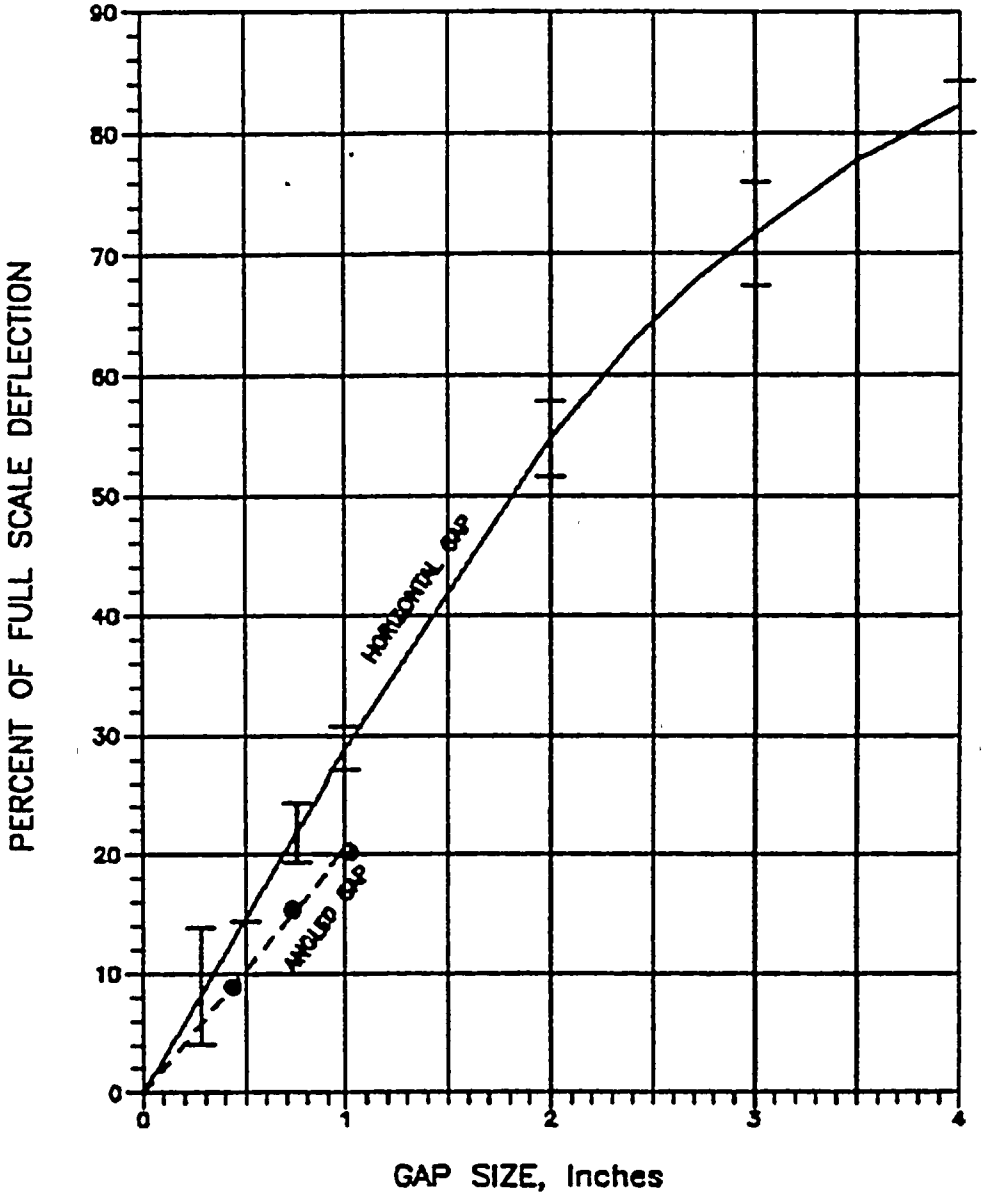

Fig. 2 CALIBRATION CURVE OF GAP SIZES