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SUBJECT: Submits response to GL 96-04, "Boraflex Degradation in Spent Fuel Storage Racks."

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Vice President
Harris Nuclear Plant

OCT 24 1996

SERIAL: HNP-96-182

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
RESPONSE TO GENERIC LETTER 96-04
BORAFLEX DEGRADATION IN SPENT FUEL STORAGE RACKS

Dear Sir or Madam:

The attachment to this letter provides Carolina Power & Light Company's (CP&L) response to Generic Letter (GL) 96-04, "Boraflex Degradation in Spent Fuel Storage Racks," for the Harris Nuclear Plant (HNP).

Questions regarding this matter may be referred to Ms. Donna Alexander at (919) 362-3190.

Sincerely,

W R Robinson

DMM/lsr

Attachment

c: Mr. J. B. Brady, NRC Senior Resident Inspector
Mr. Dayne H. Brown, N.C. DEHNR
Mr. S. D. Ebneter, NRC Regional Administrator
Mr. N. B. Le, NRC Project Manager

A008 1/1

W. R. Robinson, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are employees, contractors, and agents of Carolina Power & Light Company.

Lewis S. Rowell
Notary (Seal)

LEWIS S. ROWELL NOTARY PUBLIC WAKE COUNTY, N.C.

My commission expires: 6/21/99

ENCLOSURE TO SERIAL: HNP-96-182

SHEARON HARRIS NUCLEAR POWER PLANT
NRC DOCKET NO. 50-400 / LICENSE NO. NPF-63
RESPONSE TO NRC GENERIC LETTER 96-04
BORAFLEX DEGRADATION IN SPENT FUEL STORAGE RACKS

Question 1 *All licensees of power reactors with installed spent fuel pool storage racks containing the neutron absorber Boraflex are requested to provide an assessment of the physical condition of the Boraflex, including any deterioration, on the basis of current accumulated gamma exposure and possible water ingress to the Boraflex and state whether a subcriticality margin of 5 percent can be maintained for the racks in unborated water. Monitoring programs or calculational models in effect or being developed, or an estimation of anticipated concerns based on the specific rack design, are considered an appropriate basis for this response.*

Response 1 The HNP Boraflex surveillance coupon test results for the accelerated exposure coupons and spent fuel pool silica trends indicate Boraflex deterioration is occurring. The surveillance coupon results indicate that although the expected shrinkage of the Boraflex material is occurring, there has been little appreciable decrease in the neutron attenuation capability of the Boraflex. This has been established via comparison of surveillance coupon test results to those of unirradiated "control" coupons. Shrinkage of the Boraflex panels is anticipated and has been accounted for in the criticality analyses for the HNP fuel storage racks. The shrinkage assumptions in the criticality analyses bound the maximum shrinkage reported by EPRI for the Westinghouse designed racks used at HNP.

The current fuel pool silica levels are between 4.0 and 5.0 ppm which is in the low range of the industry levels reported by EPRI. The Westinghouse fuel rack design in use at HNP has demonstrated low susceptibility to flow accelerated deterioration of Boraflex panels contributing to the low silica levels observed and the gradual increases over time.

It is not possible for HNP to quantitatively determine whether the Boraflex racks will be capable of maintaining a 5% subcriticality margin for the lifetime of the racks in unborated water. However, there is no evidence of rapid Boraflex deterioration. Based on rack design, current silica trends, and surveillance coupon data, the Boraflex racks are expected to be capable of maintaining a 5% subcriticality margin for the near-term. The current monitoring practices (surveillance coupons and silica trending) are sufficient to provide early indication of any rapid Boraflex deterioration.

Question 2 *All licensees are further requested to submit to the NRC a description of any proposed actions to monitor or confirm that this 5 percent subcriticality margin can be maintained for the lifetime of the storage racks and describe what corrective actions could be taken in the event it cannot be maintained.*

Response 2 HNP intends to continue the coupon surveillance program and to trend fuel pool silica levels to monitor Boraflex performance. HNP is evaluating the use of the "RACKLIFE" code developed by EPRI as a means of monitoring and predicting the performance of the Boraflex panels. HNP expects to use the "RACKLIFE" code to develop a fuel rack management plan to assure that a 5% subcriticality margin can be maintained or identify when mitigating measures will become necessary. HNP also plans to obtain a new criticality analysis that would apply credit for fuel burnup, and possibly poison inserts, which could partially offset the effects of Boraflex degradation.

There are several mitigating measures available or under development at this time within the industry. CP&L actively participates in the EPRI "Boraflex User's Group" and intends to continue. Through this participation, HNP maintains an awareness of the latest research results for Boraflex degradation and state-of-the-art mitigation measures. At this time, there are several mitigation options available. Options immediately available at HNP include placing administrative controls on fuel rack storage locations and the use of stored hafnium control rods as poison inserts (51 hafnium rods are available).

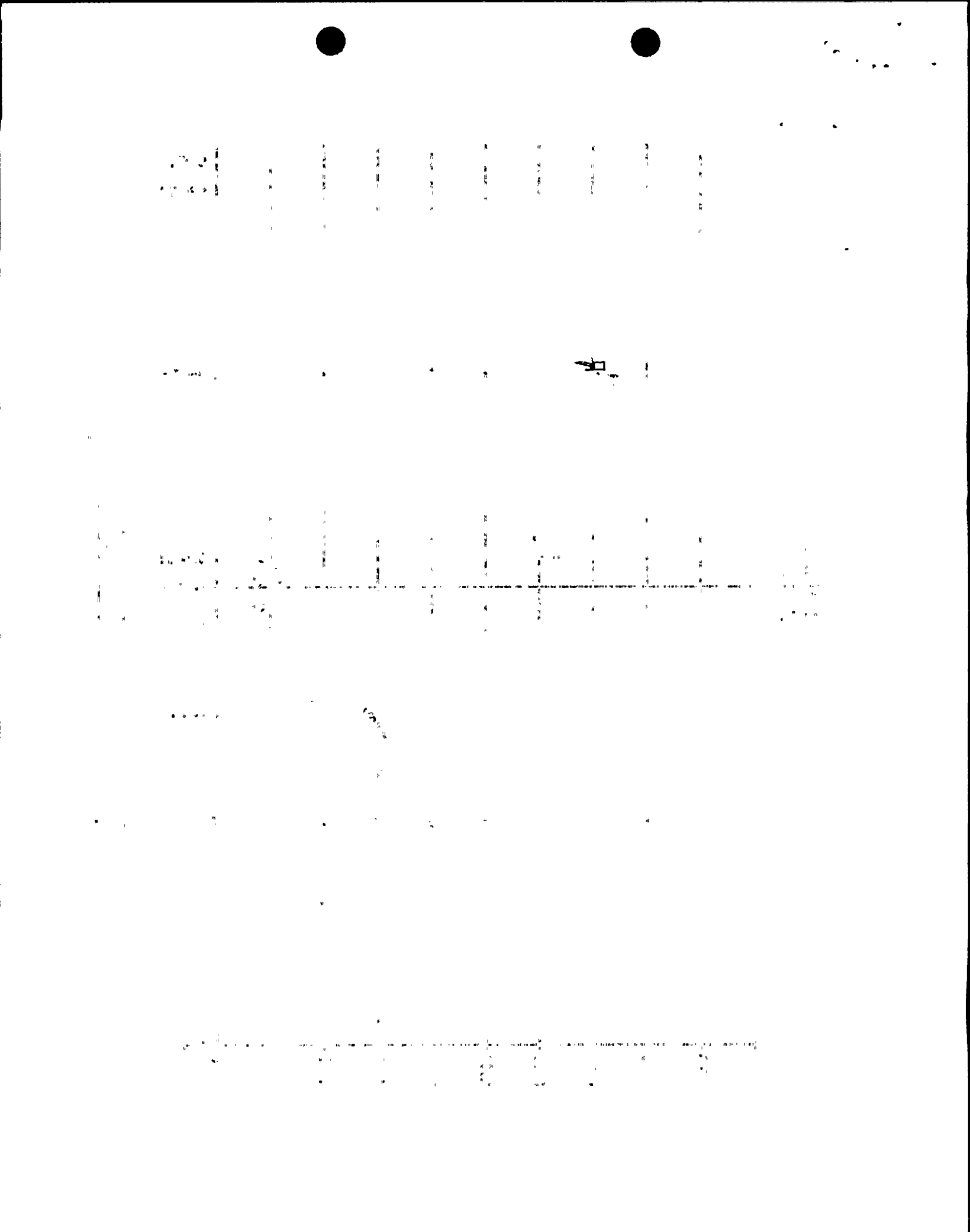
Currently, the PWR storage racks at HNP are Boraflex racks. However, HNP plans to place two additional fuel pools into service to support the CP&L Spent Fuel Shipping Program. New racks purchased for these pools will use a poison material other than Boraflex. These new racks could provide an alternate storage location for new fuel and freshly discharged fuel should the need arise.

Question 3 *Licensees should describe the results from any previous post operational blackness tests and state whether blackness testing, or other in-situ tests or measurements, will be periodically performed.*

Response 3 Blackness testing has not been performed at HNP and is not planned. HNP is reviewing the option of implementating EPRI's proposed PWR version of "BADGER" (Boron-10 Areal Density Gage for Evaluating Racks) for periodic testing as a second level of defense should surveillance testing and silica trending indicate accelerated Boraflex deterioration.

Question 4 *Chronological trends of pool reactive silica levels, along with the timing of significant events such as refuelings, pool silica cleanups, etc., should be provided. Implications of how these pool silica levels relate to Boraflex performance should be described.*

Response 4 A chronological trend graph of the silica levels in the HNP A and B fuel pools is attached. Refueling outages are noted on the graph. This trend indicates an increase in silica levels since the first refueling outage (RFO1) with the anticipated increase in silica after each subsequent refueling outage. Currently, the silica levels are at between 4.0 and 5.0 ppm, a low level compared to the industry data collected by EPRI, and do not indicate accelerated dissolution of the Boraflex. HNP has not performed and is not planning pool silica cleanups.



Attachment to HNP 96-182
Harris Nuclear Plant Fuel Pool Silica Levels