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Public Service Electric and Gas Company 80 Park Place Newark, N.J. 07101 Phone 201/430-7000

November 20, 1978

Director of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. A. Schwencer, Chief
Operating Reactors Branch 1
Division of Operating Reactors

Gentlemen:

INCREASED CAPACITY SPENT FUEL RACKS
NO. 1 UNIT
SALEM NUCLEAR GENERATING STATION
DOCKET NO. 50-272

Public Service Electric and Gas Company hereby submits additional information in support of its application to increase the spent fuel storage capacity at the Salem Nuclear Generating Station. This information is in response to discussions held with members of your staff.

This submittal consists of forty copies.

Should you have any questions regarding this application, please do not hesitate to contact us.

Very truly yours,

F. P. Librizzi
General Manager -
Electric Production

Attachment

A001/S *
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ADDITIONAL INFORMATION IN SUPPORT OF QUESTIONS 17 AND 23

A summary of the non-linear and linear elastic cases which have been analysed and the results obtained therefrom are as follows:

Case	Initial Condition	Friction Coefficient	Wall Impact Load
1	Equally spaced	0.3	No impact
2	Equally spaced	0.2	No impact
3	One rack against wall	0.3	21,800 lbs.
Linear Elastic		0.3	7,000 lbs. net wall load

The above analyses all considered racks full of fuel which cause the maximum wall loads. It should be noted that, for Case #3, the friction coefficient used in the analysis was erroneously reported as 0.2 in our submittal of July 31, 1978.

The friction coefficient test data previously submitted were the actual results obtained for individual tests. The recent report: "Friction Coefficients of Water-Lubricated Stainless Steels for a Spent Fuel Rack Facility" by Professor Ernest Rabinowicz of MIT, performed for the Boston Edison Company provides considerable additional data. This report provides the results of 134 tests that are representative of the Salem fuel storage rack/pool environment. The results of test series 1, 3, 5 and 7 from the report were neglected. These tests were performed at a sliding speed of 4 inches/sec., compared to 0.04 in/sec for the other sliding tests. Since the average friction coefficient is substantially higher than the maximum value of 0.4 required to permit sliding it is anticipated that the racks will not slide. The 134 low speed sliding and static test results were, therefore, considered as being representative. A statistical analysis of the 134 test results shows a mean friction coefficient of 0.563 and a standard deviation of 0.096.

The lowest single value measured for these 134 tests was 0.37. The statistical analysis of these small diameter (0.09") friction tests to determine a minimum friction value is very conservative in that each rack module is supported on seven feet, each of which is 6 inches diameter. This tends to average the friction coefficient and to suppress extreme values. The results of these tests are in good agreement with the results previously reported and demonstrate the conservatism of using a value of 0.3 for analytical purposes. The test results also show that there is a high probability that, even under SSE seismic conditions, the racks will not slide on the pool floor and the wall braces will be unloaded

There is no technical justification for assuming that racks are in contact with a pool wall when analyzing a seismic event. The racks are initially installed in the center of the pool with a thermal expansion clearance between the wall braces and the pool walls on all four sides. Initial pool heat-up will cause all rack modules to move outward from the center of the pool, after which each module will be free to expand and contract about its own center. As a worst case, the condition can be postulated wherein a rack at one end of the pool remains stationary and the other three racks expand away from that rack towards the other end of the pool. The resulting minimum gap of 0.115" is sufficient to ensure that even one rack would not subsequently be impacted by the wall during a seismic event. The assumed presence of one rack against a wall does not result from analysis, but was arbitrarily considered solely for the purpose of establishing a conservative design basis for the strength of the wall braces. Clearly, consideration of lumping more than one rack against a wall is not warranted.

The second paragraph in the answer to the second question presented a qualitative discussion of multiple rack impacts, not based on analysis. Considering the foregoing discussion that paragraph should be disregarded.