



Southern Nuclear Operating Company

the southern electric system

10 CFR 50.55a(g)

J. D. Woodard
Vice President
Farley Project

April 10, 1992

Docket Nos. 50-348
50-364

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Joseph M. Farley Nuclear Plant
Request for Additional Information on
Inservice Testing of Service Water Pumps

Gentlemen:

By letter dated February 14, 1992, the NRC submitted its Request for Additional Information (RAI) on Service Water pump testing performed at Farley Nuclear Plant. The following information is provided in response to the NRC's RAI.

ITEM 1 Individual Pump Testing

NRC REQUEST Provide justification for not individually flow testing the service water pump during cold shutdowns and refueling outages when plant conditions permit operation of a single pump.

SNC RESPONSE Cold shutdowns are normally of insufficient duration to perform individual testing of the service water pumps. Testing of the pumps at refueling is possible; however, the data provided would not be meaningful in trending degradation on the pumps. The individual pump flow reference value required by the ASME Code could only be set during refueling. Subsequently, only like tests performed every 18 months at refueling could be compared to this reference value to detect degradation. At present, service water pumps are overhauled every five years due to service conditions. This overhaul necessitates the setting of a new baseline in accordance with IWP-3111. Since this overhaul occurs every five years, the maximum number of tests that could be compared to this baseline would be three tests before another overhaul took place. Since three points are required as a minimum to determine a statistical trend, by the time degradation is noted by this test, corrective action will already be required due to pump maintenance schedules.

AC47
1/0

ITEM 2 Nonintrusive Diagnostic Methods

NRC REQUEST Address the feasibility of nonintrusive diagnostic method of flow measuring for each service water pump when plant conditions do not permit operation of a single pump.

SNC RESPONSE Nonintrusive diagnostic flow measuring devices require that the transducers be mounted in areas where the flow profile is well developed. In general this requires a straight run of pipe at least 4 or 5 pipe diameters from the nearest flow restricting device. Since the discharge pipe on the service water pumps is 20" in diameter, a straight run of at least 6 feet past the discharge butterfly valve is required to install the measuring device correctly. On the discharge of a service water pump, the following components are in series: an expansion joint, two inches of pipe, a discharge check valve, and a butterfly valve. After the butterfly valve there is only about 3 feet of straight run pipe where a flow measuring device could be installed. Therefore it is not feasible to install a nonintrusive diagnostic flow measuring device that could measure flow accurately.

ITEM 3 Masked Pump Performance When Testing Pumps In Pairs

NRC REQUEST Quantify the extent to which the hydraulic performance of a degraded pump may be masked by the other pump when the service water pumps are tested in pairs. Take into consideration the effects of the accuracy of the flow instrument used to measure the combined flow and where the pumps are operating relative to the pump curves.

SNC RESPONSE Flow reference values are set taking into account instrument accuracies as specified by Table IWP-4110-1 and the requirement that all reference values be set when the equipment is operating acceptably. All reference values shall also insure that the pump is capable of performing its safety related function. The safety related function of a service water pump is defined in the FSAR in terms of two pumps in operation per train. The reference points are set, based on empirical data, at values sufficiently above those required for accident flow such that instrument accuracies are bounded.

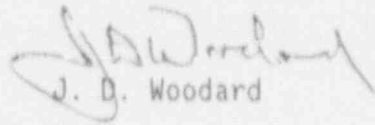
In order to prevent masking of a pump that has been in service for a period of time by a recently overhauled pump a new baseline is set for the overhauled pump. After overhaul on a particular pump a flow test is performed to determine the new baseline. This new baseline is based on actual test data as required by IWP-3110 and therefore increased pump performance is included in the new baseline. Degradation is then trended from that point.

To take into consideration where the pumps are operating relative to the pump curves, FNP sets all flow reference values while maintaining the individual pumps at the same differential pressure. The tolerance on this differential pressure is ± 1 psig (or about 1.2%). Since all the service water pumps are held at the same differential pressure, all the pumps are maintained at the same point on their centrifugal pump curves. By maintaining all differential pressures at the same point, an individual pump flow analysis may be performed. Since all pumps are tested at the same differential pressure, this individual analysis will detect any masking that may be occurring.

If there are any questions or if additional information is needed, please advise.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY



J. D. Woodard

JDW/EB:map

cc: Mr. S. D. Libneter
Mr. S. T. Hoffman
Mr. G. F. Maxwell