

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

SUBJECT: Submits description of plant RCS hot & cold leg temp monitoring instrumentation, per Regulatory Guide 1.97, Rev 3.

NOTES:Application for permit renewal filed.

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Carolina Power & Light Company

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United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
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SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
REGULATORY GUIDE 1.97, REVISION 3
RCS HOT AND COLD LEG TEMPERATURE MONITORING.

Gentlemen:

Carolina Power & Light Company hereby submits the following description of the design of the SHNPP Reactor Coolant System (RCS) hot and cold leg temperature monitoring instrumentation. This submittal is being made as a result of the Regulatory Guide 1.97, Rev. 3 audit conducted at SHNPP during the week of August 29 through September 2, 1988. During the course of the audit, the Company was requested to provide NRR with a clarification of the design of the RCS hot and cold leg temperature monitoring instrumentation (variables A.1.1 and A.1.2) with respect to redundancy/diversity. Inspection Report 88-29, Unresolved Item 88-29-01, dated October 25, 1988 documents this request. The Company believes that the design of the RCS hot and cold leg temperature monitoring instrumentation meets the requirements of Regulatory Guide 1.97, Rev. 3. This design was approved by the NRC in Appendix H of NUREG-1038, Supplement No. 3, "Safety Evaluation Report related to the operation of Shearon Harris Nuclear Power Plant, Unit No. 1," dated May 1986.

Regulatory Guide 1.97, Rev. 3 specifies that the RCS hot and cold leg instrumentation be Category 1 equipment. The design and qualification criteria for Category 1 instrumentation provided in Table 1 of Regulatory Guide 1.97 specifies that redundant or diverse channels should be electrically independent and physically separated from each other. The design of the RCS hot and cold leg instrumentation at SHNPP provides diverse indications which are electrically independent and physically separated. Both the hot and cold leg temperature RTDs are provided with three power sources; offsite A.C., onsite A.C. (emergency diesel generators) and onsite safety grade D.C. power. The hot leg temperature measurements are normally energized from the offsite A.C. power source through Division A and the cold leg temperature measurements through Division B. The emergency diesel generators or the D.C. power system may be automatically or manually used to energize the hot and cold leg temperature RTDs if the normal offsite power is lost. This design, composed of three alternate power sources, establishes reliable and adequate instrumentation to directly monitor the RCS temperature.

In accordance with Regulatory Guide 1.97, diverse channels of information that are physically separated and electrically independent are provided for RCS temperature. The diverse measurements are provided with a power train separate from the primary measurements and, therefore, would not be affected by a loss of power train to the primary measurements.

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SHNPP is equipped with 51 safety grade core exit thermocouples, 26 energized by the Division A power train and 25 from the Division B power train. With a loss of the normal and alternative power (Division A) to the RCS hot leg RTDs, the 25 core exit thermocouples (variable C.1.1) that are powered by the Division B power train continue to provide the plant operators with RCS hot leg temperature indications.

With a loss of the normal and alternate power (Division B) for the RCS cold leg RTDs, the steamline pressure indicators (variable A.4.2) that are energized by the Division A power train would provide the plant operators with an indication of RCS cold leg temperature. The SHNPP nuclear steam supply system is designed such that the cold leg temperature approximates the saturation temperature corresponding to secondary pressure. Westinghouse has confirmed that there would be only a small variance between the actual cold leg temperature and the saturation temperature corresponding to steamline pressure during cooldown to cold shutdown.

Regulatory Guide 1.97, Rev. 3 does not require fully redundant hot and cold leg RTDs but provides for either redundant or diverse measurement of the primary measurements. For a loss of the normal and alternate power to the hot and cold leg RTDs, the diverse measurements provide the plant operator with a consistent and acceptable reactor coolant system temperature indication. The combination of direct measurements with normal and alternate power sources and separately powered diverse measurements provides a reliable and adequate reactor coolant temperature indication. No single power source component failure, even coupled with a loss of offsite power, would preclude the monitoring of reactor coolant system temperature.

Please refer any questions regarding this submittal to Mr. Mark A. Turkal at (919) 362-2985.

Yours very truly,



L. I. Loflin

Manager

Nuclear Licensing Section

LIL/MAT

cc: Mr. R. A. Becker
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