SNUPPS
Standardized Nuclear Unit
Power Plant System

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SLNRC 81-126 FILE: 0278
SUBJ: Natural Circulation Cooldown

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Docket Nos: STN 50-482 and STN 50-483

Ref: 1) NRC (Eisenhut) Generic Letter No. 81-21, dated May 5, 1981

2) Westinghouse Owners Group Letter (OG-57) to NRC (Check) dated April 20, 1981

Dear Mr. Denton:

The response to reference 1 dealing with natural circulation cooldown for the SNUPPS plants (Callaway and Wolf Creek) is as follows:

1. Basis for Response

After the St. Lucie incident, the NRC recommended various items for power reactor licensee consideration. These items are listed in IE Circular 80-15 and include establishing a natural circulation cooldown/depressurization rate envelope to preclude void formation in the upper head region of the reactor vessel. Subsequent to this, the Westinghouse Owners Group undertook a study with Westinghouse to ascertain the potential for void formation in Westinghouse designed NSSS's during natural circulation cooldown/ depressurization transients and to develop appropriate modifications to Westinghouse Owners Group Reference Operating Instructions. A description of the study, including major assumptions and results, was submitted to the NRC by reference 2.

2. Plant Characteristics

The SNUPPS plants are in the category of T_{COLD} upper head plants and, based on the Westinghouse calculations, can be cooled down during natural circulation operation at a maximum rate of $50^{o}F/hr$, provided a specified minimum subcooling is maintained.

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The minimum required subcooling is 50°F if CRDM fans are operating and 100°F if CRDM fans are not operating (Table 8 of refrence 2).

No difficulties are anticipated in maintaining the specified minimum subcooling. Heat losses from the pressurizer are relatively small and the pressurizer heater emergency power supply conforms to all of the requirements of NUREG-0578, item 2.1.1a. In addition, the secondary side atmospheric relief valves in the SNUPPS plants are fully qualified to IEEE-323 (1974) and IEEE-344 (1975) and provided with Class IE Power and a fully-qualified pressurized nitrogen supply. The pressurizer power operated relief valves (PORV's) and block valves are also fully qualified to IEEE-323 (1974) and IEEE-344 (1975) and provided with Class IE power and automatic circuitry to close a block valve if a PORV sticks open.

A cooldown rate of 50°F/hr is consistent with the design basis for the auxiliary feedwater system and condensate storage tank (CST). That is, the CST contains sufficient condensate quality water to maintain hot standby for 2 hours and then cool down the reactor coolant system at a rate of 50°F per hour to a temperature of 350°F, at which point the residual heat removal system can operate (FSAR, Section 9.2.6). This is based on the minimum CST volume. Normally hot standby could be maintained for many hours more before initiating cooldown of the reactor coolant system.

3. Operating Procedures and Operator Training

Generic procedural guidelines for Westinghouse plants have been developed by the Westinghouse Owners Group to preclude void formation in the upper head region of the reactor vessel during natural circulation cooldown/depressurization transients, and to specify those conditions under which upper head voiding may occur. Operating Procedures for the SNUPPS plants will be written based on the Westinghouse generic procedural guidelines and will include the specific limits on cooldown rate and subcooling stated under item 2.

The SNUPPS operators will be trained in the use of these procedures on a SNUPPS-plant simulator. Procedures will be available and simulator training completed prior to issuance of Operating Licenses.

Very truly yours,

Nicholas A. Petrick

FS/bds/10b22

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