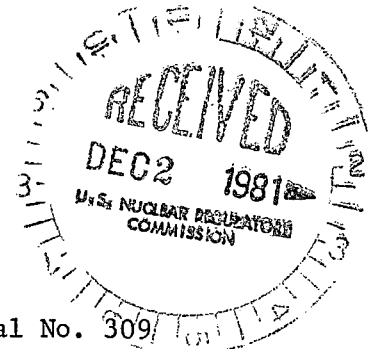


VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261



R. H. LEASBURG  
VICE PRESIDENT  
NUCLEAR OPERATIONS

November 30, 1981

Mr. Harold R. Denton, Director  
Office of Nuclear Reactor Regulation  
Attn: Mr. Darrell G. Eisenhut, Director  
Division of Licensing  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Serial No. 309  
NO/RMT:rmt  
Docket Nos. 50-280  
50-281  
50-338  
50-339  
License Nos. DPR-32  
DPR-37  
NPF-4  
NPF-7

Gentlemen:

SUBJECT: NATURAL CIRCULATION COOLDOWN (Generic Letter No. 81-21)

By letter of May 5, 1981, information was requested concerning operator training, cooling water supply availability, and demonstration of procedural adequacy for natural circulation cooldown. The following information is being provided pursuant to 10CFR50.54(f) for our Surry and North Anna facilities.

In our letters dated December 5, 1979 (Serial No. 1002), February 6, 1980 (Serial No. 115), March 19, 1980 (Serial No. 251) we provided substantial information pertaining to the special test program for North Anna Unit 2. Tests 1 through 5 of that program dealt specifically with natural circulation cooldown. By letter dated July 22, 1980 (Serial No. 648) we forwarded the North Anna Power Station Unit 2 low power tests report which supplemented our previously submitted July 17, 1980 letter. The principal subject of the July 22 letter was the Natural Circulation Test Report for North Anna Unit 2.

By letter dated April 27, 1981 (WOG-81-161), VEPCO was provided the results of the Westinghouse Electric Corporation study of the St. Lucie cooldown. The conclusions drawn in that report indicate that, even with the control Rod Drive Mechanism cooling fans not available, the plant can effectively be cooled down to Residual Heat Removal conditions at a rate of 50F per hour with no void formation in the upper head area if the operator maintains 100F subcooling during the depressurization. Figure No. 47 of that letter presents a cooldown curve which utilizes a 50F subcooling margin until the primary system pressure is reduced to 1900 psi, at which point the subcooling margin is increased to 200F. Surry Power Station Abnormal Procedure No. AP-39 was revised on August 20, 1981 to incorporate the changes recommended by the Westinghouse analysis. The procedural changes recently instituted at the North Anna Power Station include revisions to the currently utilized normal cooldown/depressurization procedure (OP-3.2) and a new Abnormal Procedure (AP-49) which will be the controlling procedures for natural circulation cooldown utilizing the latest recommendations from the Westinghouse analysis.

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The modified curve for controlled natural circulation cooldown without CRDM fans in operation increases the subcooling margin to 150F from 50F which places the area of safe operation within the Technical Specification temperature/pressure curve for heatup and cooldown (more restrictive than the 200F margin). This 150F subcooling margin is considered to be an interim measure pending further evaluation by both Westinghouse and VEPCO. Since the nature of this evaluation is very plant specific, the majority of it is intended to be performed by VEPCO utilizing recommendations derived from work being performed by the Westinghouse Owners Group and Westinghouse Corporation.

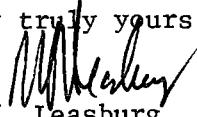
The verification of adequate condensate-grade auxiliary feedwater supplies for Surry Power Station is best discussed when referencing the Abnormal Procedure currently established for Station Blackout (AP-11). Figure 1 of AP-11 titled "Condensate Storage Requirements for Cooldown to RHR Cut-In for VEPCO Surry Units 1 and 2" graphically illustrates the feedwater requirements following a plant trip from full load (100% Reactor Power) as a function of condensate storage available at the time of trip. The current storage capacity of the Emergency Condensate Storage Tanks, Main Condensate Storage Tanks, and the existence of the Fire Protection System cross-connects to the Auxiliary Feedwater System and the Auxiliary Feedwater System cross-connect between the two units provides sufficient capacity for cooling the plant down to cold shutdown conditions. Verification for the North Anna facility revealed that the combined on-site condensate storage and the Service Water Reservoir, Lake Anna, and the Lake Anna discharge canal can provide a virtually inexhaustible supply of cooling water.

Regarding the training aspect of the subject letter, on July 23, 1981, VEPCO submitted the changes to the Surry simulator model as required by NUREG-0053 and compared the results of the natural circulation tests at North Anna with the simulator natural circulation test. The comparison reveals a difference in the reactor coolant hot leg temperature versus cold leg temperature delta-temperatures over time which are attributable to variances in plant design and core power ratings. No significant evidence existed during the test to indicate that any approach was made to a vessel voided condition. It is accepted that the results are applicable to actual plant operating conditions. Training on the St. Lucie event has been incorporated into the Reactor Operator/ Senior Reactor Operator Training Program and was covered in the 1981 Licensed Operator Requalification Program commencing on May 3, 1981 with all licensed operators completing this training prior to September 30, 1981. This training includes a detailed discussion of the circumstances accompanying the event at St. Lucie and the chronological sequence of events which occurred. The plant operators have been instructed as to precautions which should be taken to preclude on occurrence of this nature at the plant and which specific indications would indicate vessel head voiding.

VIRGINIA ELECTRIC AND POWER COMPANY TO Harold R. Denton

It should be noted that both the North Anna and Surry operations personnel are retrained at the Surry simulator facility and receive virtually identical requalification.

Very truly yours,

  
R. H. Leasburg

Enclosure

cc: Mr. James P. O'Reilly, Director  
Office of Inspection and Enforcement  
Region II

References

1. Surry Power Station Abnormal Procedure No. AP-11, "Station Blackout" (11-19-73)
2. Surry Power Station Abnormal Procedure No. AP-39, "Natural Circulation of Primary Coolant", (8-20-81)
3. December 5, 1979 letter (Serial No. 1002) to Steven A. Varga on North Anna Special Test Program.
4. February 6, 1980 letter (Serial No. 115) to Steven A. Varga on North Anna Special Test Program.
5. March 19, 1980 letter (Serial No. 251) to H. R. Denton regarding special test program for North Anna Unit 2.
6. Inspection and Enforcement Circular No. 80-15, dated June 20, 1980 titled Loss of Reactor Coolant Pump Cooling and Natural Circulation Cooldown.
7. July 22, 1980 letter (Serial No. 648) to H. R. Denton reporting the Natural Circulation Test Report for North Anna Unit 2.
8. July 28, 1980 letter to Thomas Anderson from Paul S. Check concerning Void formation in Vessel Head During St. Lucie Natural Circulation Cooldown Event of 6-11-80.
9. Westinghouse Electric Corporation: September 3, 1980 letter to Paul S. Check, NRC, (NS-TMA-2298) on potential for void formation in the reactor vessel head during a natural circulation cooldown.
10. Westinghouse Electric Corporation: September 10, 1980 letter to E. R. Smith, Jr. on Void Formation in Vessel Head During Natural Circulation Cooldown (WOG-80-126)
11. Surry Power Station Operating Procedure No. OP-14, "Residual Heat Removal System", (10-31-80).
13. December 1980 Analysis and Evaluation of St. Lucie Unit 1 Natural Circulation Cooldown: INPO/2, NSAC/16.
14. Westinghouse Owners Group letter of April 20, 1981 (OG-57) on St. Lucie Cooldown Event Report to Paul S. Check.
15. Inspection and Enforcement Circular No. 81-10, dated July 2, 1981 titled Steam Voiding in the Reactor Coolant System During Decay Heat Removal Cooldown.
16. VEPCO letter Serial No. 450, July 23, 1981 to H. R. Denton reporting changes to Surry simulator model for natural circulation cooldown.
17. Westinghouse Owners Group letter of July 24, 1981. R. W. Jurgensen to D. G. Eisenhut (OG-62) concerning natural circulation cooldown procedures.

References

18. American Electric Power Service Corporation letter to D. G. Eisenhower dated July 24, 1981 concerning procedures and training for natural circulation cooldown. Signed by Robert W. Jurgensen, Chairman, Westinghouse Owners Group.