

GENERAL ELECTRIC

NUCLEAR SYSTEMS TECHNOLOGY OPERATION

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MFN 134-85

November 6, 1985

Mr. R. A. Becker
Procedures and Systems Review Branch
U.S. Nuclear Regulatory Commission
Washington D. C., 20555

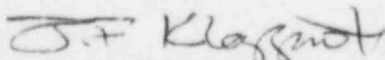
Dear Dick:

Subject: Elimination of Test Condition 4 From the GE Startup Test Program

Per our discussion of 10/31, attached is a more detailed justification for elimination of Test Condition 4 (TC4) from the startup test program. As stated during our discussion, the power/flow operating condition corresponding to TC4 is not considered a normal operating mode of a BWR since plant technical specifications require both recirculation pumps to be operable. If both recirculation pumps trip, the operator is required to immediately take action to exit the TC4 power/flow condition and place the unit in the startup mode within 6 hours.

It is requested that you reconsider your current position that elimination of TC4 should not be allowed. If you have any additional questions concerning this issue, please call me on (408) 925-5434.

Very truly yours,



J. F. Klapproth
Operating Plant Programs Manager
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TEST CONDITION 4 - NATURAL CIRCULATION OPERATION
DELETE TEST CONDITION

OBJECTIVE:

Regulatory Guide 1.68 (Revision 2, August 1978), Appendix A, paragraph 5 requires that "appropriate consideration should be given to testing at the extremes of possible operating modes for facility systems. Testing under simulated conditions of maximum and minimum equipment availability within systems should be accomplished if the facility is intended to be operated in these modes." Test Condition 4 defines the region of the power/flow map at natural circulation near the 100% load line. Testing of core performance and control system response is currently planned to be performed in this region. It is proposed that all testing in Test Condition 4 be deleted.

DISCUSSION:

Operation at natural circulation conditions is not an intended mode of operation for a BWR. Plant Technical Specifications (3/4.4.1) define the limiting condition for operation (LC0) of the recirculation system as two reactor coolant system recirculation loops in operation. Therefore, natural circulation conditions are a violation of the LC0 and cannot intentionally be entered. Natural circulation conditions can only be reached as the result of a moderate frequency event (two recirculation pump trip, 0.25 events/plant-year). Section 3/4.4.1 of the Technical Specification requires that with no reactor coolant system recirculation loops in operation the operator should immediately initiate an orderly reduction of thermal power to less than or equal to the 80% load line within two hours. In addition, the operator must then initiate measures to place the unit in at least the startup mode within 6 hours and in hot shutdown mode within the next 6 hours (since Test Condition 4 testing is planned for 24 hours, a Special Test Exception is required in the Technical Specifications to allow the testing, section 3.10.4).

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Therefore, operation near the 100% load line at natural circulation (Test Condition 4) is not allowed to exceed two hours and operation at any power level in natural circulation is not allowed to exceed 12 hours. Because of these restrictions on operation at natural circulation conditions, it is concluded that testing of steady state and control system performance is not required. Extensive special testing at natural circulation has previously been performed at several BWRs covering a wide range of plant and core designs. These tests have thoroughly characterized the performance of the BWR at natural circulation conditions and no further testing is required.

Since natural circulation operation occurs as the result of a two pump trip, operator training required during these conditions involves restarting of the recirculation pumps. This training is adequately covered during the recovery from the planned single recirculation pump trips. Startup Test 30A, performs a single recirculation pump trip at Test Condition 3 and 6 thereby testing both pumps. After the pump trips and steady state conditions are reached, the active recirculation pump speed is reduced to minimum and the idle loop is restarted. Following a two pump trip, the procedures are no different for restarting the pumps in that one pump at a time is restarted. Therefore, the pump restarts following the two planned single pump trips will provide adequate operator training for restarting idle recirculation pumps.

Startup Test 16A, 16B, 19, 21, 22, 23A and 30C are currently planned to be performed at Test Condition 4 and therefore will be deleted when Test Condition 4 testing is deleted. Startup Test 16A, Selected Process Temperatures (Vessel Temperature), requires vessel and recirculation loop temperatures to be measured during planned recirculation pump trips to determine if temperature stratification occurs in the idle recirculation loops or in the lower plenum when one or more loops are inactive. The Power Ascension Program Acceleration proposed to substitute Startup Test 16A with Technical Specification surveillance requirements which require measuring recirculation loop and vessel bottom head drain temperatures to assure that stratification does not occur during operation with an idle recirculation loop(s).

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Compliance with these requirements as applicable will satisfy the objectives of Startup Test 16A and therefore, Test Condition 4 testing is not required to obtain this data.

Startup Test 16B, Water Level Reference Leg Temperature demonstrates the calibration and agreement of the installed reactor vessel water level instrumentation at normal operating pressure and temperature. Testing will be performed at all test conditions except Test Condition 4, which will adequately demonstrate the system performance over its expected operating range.

Startup Test 19, Core Performance, evaluates the principal thermal and hydraulic parameters associated with core behavior. These parameters must meet appropriately calculated limits as specified in Vendor Test Specifications and Plant Technical Specifications. This testing will be performed as required by Plant Technical Specifications as proposed by the Power Ascension Program Acceleration. Since operation at Test Condition 4 is not an intended mode of operation and system parameters are adequately measured at other test conditions as required by Technical Specifications, evaluating these parameters at Test Condition 4 is not required.

Startup Test 21, Core Power-Void Mode Response, demonstrates the stability of the core local power-reactivity feedback mechanism with regard to small perturbations in reactivity caused by rod movement. This testing is being deleted as part of the Power Ascension Program Acceleration and therefore testing at Test Condition 4 is not required.

Startup Test 22, Pressure Regulator Response, demonstrates the reactor pressure control system responses to pressure regulator setpoint changes, the stability of the reactivity-void feedback loop to pressure perturbation, the control characteristics of the bypass and control valves and the takeover capabilities of the backup pressure regulator. Testing will be performed at all test conditions except Test Condition 4 adequately demonstrating the performance of the pressure control system. Since operation at Test Condition 4 is not an intended mode of operation

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and system performance is demonstrated at other test conditions, testing at Test Condition 4 is not required.

Startup Test 23A, Feedwater Control System Demonstration, evaluates and adjusts the feedwater control system response to water level and feedwater flow changes. Testing will be performed at Test Conditions 2, 3, 5 and 6, adequately demonstrating the performance of the feedwater control system. Since operation at Test Condition 4 is not an intended mode of operation and system performance is demonstrated at other test conditions, testing at Test Condition 4 is not required.

Startup Test 30C, Recirculation System Performance, determines the steady state conditions following a two pump trip to natural circulation conditions. The two pump trip test at Test Condition 3 (Startup Test 30B) is proposed to be deleted as part of the Power Ascension Program Acceleration and Test Condition 4 is not an intended mode of operation and therefore, the steady state data at natural circulation is not required.

No other startup test procedures are affected by this change.

CONCLUSION:

Testing of plant systems is performed over a wide range of operating conditions representing the extremes of possible operating modes intended for the plant. These tests meet the objectives of Regulatory Guide 1.68, Appendix A, paragraph 5. The proposed test change does not adversely affect any safety system or the safe operation of the plant and therefore does not involve an unreviewed safety question. Test Condition 4 can therefore be deleted from the Power Ascension Test Program.