400 Chestnut Street Tower II

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May 12, 1980

Director of Nuclear Reactor Regulation
Attention: Mr. L. S. Rubenstein, Acting Chief
Light Water Reactors Branch No. 4
Division of Project Management
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Rubenstein:

In the Matter of the Application of) Docket No. 50-327
Tennessee Valley Authority)

Enclosed for use in your review of the Sequoyah Nuclear Plant unit 1 special low-power test program is the following information.

1. Three copies of the special test instructions, section 5 of the Master Plan for the Special Low-Power Test Program, which have been reviewed by the Plant Operations Review Committee and approved for use by the plant superintendent. These procedures supersede all other revisions. Ten additional copies will be provided under separate cover for use in revision of your copies of the Master Plan.

2. Ten copies of the responses to the questions on the special test program transmitted to TVA in your letter to H. G. Parris dated April 10, 1980.

3. Ten copies of a description of operator training provided by the special test program.

If you have any questions, please get in touch with M. J. Burzynski at FTS 854-2581.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Regulation and Safety

Enclosures

ENCLOSURE 2

RESPONSE TO NRC QUESTIONS ON SEQUOYAH SPECIAL TESTS RECEIVED JANUARY 24, 1980

1.0 a) The special tests are scheduled as a part of the normal startup test program. The sequence in which the individual tests are performed is a part of the master sequencing instruction (S-U 7.1) in the Sequoyah Startup Procedures. A copy of this instruction is included in the Master Plan For the Special Test Program which has been provided for your staff review.

b) Each individual test specifies the conditions to be established and maintained. Manual operator actions are provided if certain limits are exceeded. All emergency procedures are applicable. Depending on the circumstances of the emergency, the appropriate emergency procedure will be used.

c) At the conclusion of each test there are specific steps, with signoffs, to reinstate all equipment to normal unless another test which requires the same alignment is to immediately follow.

d) TVA has issued an administrative procedure (Sequoyah Nuclear Plant, Standard Practice SQA 109) which addresses the conduct of the special test program. This procedure includes the following information for the Special Test Program; purpose and objective, responsibility of organizations, preparation, review and approval of instructions, conduct of tests (including other applicable administrative procedures), and evaluation and approval of results.

This procedure also specifies that the shift engineer (SRO), assisted by the assistant shift engineer (SRO) and licensed unit operators, is responsible for instituting immediate action in any situation to eliminate difficulties and to preclude violation of the operating license, technical specifications, or to avert possible injury to personnel or equipment damage.

The test engineer can stop a test when, in his opinion, conditions warrant such action. However, he has no authority over the licensed operator. If the test engineer stops a test, it is the licensed operator's responsibility to put the plant in an acceptable condition.

2. a) Any special arrangements of the plant outside normal operating procedures are outlined in the prerequisites of each test.

b) The main control board has two trend recorders each of which having two recording pens. These recorders are used by operators

to trend parameter of the most interest during a particular operation. At this time three of the recorders will be used to trend core exit thermocouples with the fourth permanently recording the reactor coolant saturation margin. The rest of the thermocouples are recorded at five minute intervals by the computer and printed on the trend printer.

c) The reactor coolant bypass flow fraction will change under natural circulation; however, the calorimetrics run to determine core power are done under forced flow conditions with all four RCP's running.

d) Normal operationg procedures are used throughout the special test program. Those necessary deviations are contained in the special test instruction. These test procedures have been reviewed relative to the normal operating procedures to eliminate possible ambiguities.

e) Special Test 7 is the only test in which all auxiliary building lighting is shut off. This was the only reason for evacuating personnel.

f) In steps requiring the movement of valves or equipment which might cause confusion for the operator (as in step 5.10), the procedures have been changed to include multiple signoffs. It has not been the policy in these or the startup tests to specify or require individual signoffs for every valve movement.

g) The procedures have been reviewed in light of this comment and changes incorporated where applicable.

3. a) There are no plans to run the diesels just prior to this test. The Surveillance Instructions regarding the diesel generators are performed periodically as required by the STS. This S.I. will not be run just prior to the conduct of test 7.

b) (1) The operator is aware of the direction of change of charging and steam flow to increase the saturation margin through both normal training and simulator training on these tests.

(2) The results of all the tests will be evaluated for possible corrections or improvements to plant operating instructions.

c) (1) As presently scheduled there is little or no time between the tests. If a significant delay is expected between tests, the provision to return all safety features to normal is in each test.

(2) The whole data sheet is referenced to be carried out at the intervals indicated in each page. These pages have clearly established intervals between data accumulation. The page concerning the batteries is no more important than the other pages.

d) (1) Items 2.6 and 2.7 have been deleted from the procedure. The Westinghouse safety evaluation and the table of Technical Specification Exceptions clearly define which trips are inoperable. The only safety feature being modified in any test is the automatic initiation of Safety Injection.

(2) Reactor power and intermediate range channels and the reactivity computer will be monitored continuously. The five minute intervals indicated in the test are recording intervals to be used on the plant computer for trend printing these parameters. This printed trend is to be used as a permanent copy of the parameters.

(3) As indicated in the reply to question 2.6., one of the four trend recorders permanently monitors saturation margin. The tests have been corrected to reflect this.

(4) See reply to question 1.c.

e) This was a typographical error and has since been added to the procedure.

4. a & b) The establishment and maintenance of natural circulation for two-phase and single-phase flow conditions require essentially the same operator actions. These actions would be the same as long as adequate core cooling is demonstrated by the establishment of the conditions indicated in these tests and the procedures for natural circulation. In the event those conditions are not met and adequate core cooling is not demonstrated, the operator would take action as defined by the emergency procedures for inadequate core cooling. Training in the use of these procedures is provided on the Sequoyah Simulator.

5. The safety analysis has been submitted.

6. This data is being accumulated in the existing preoperational test W1.8, RCS Flow Coastdown. If you wish to review this procedure, we will provide it to you.

RESPONSE TO NRC QUESTIONS ON SEQUOYAH SPECIAL TESTS RECEIVED JANUARY 24, 1980

7. It is not the purpose of any of these tests to quantitatively identify system heat losses. The tests are rather to identify, given the various heat losses, depressuirzation and cooldown rates under certain conditions and give the operator experience with system response in these conditions.

8. Under natural circulation conditions, turbulent flow will exist in the reactor coolant system piping. With these flow conditions we do not expect the indicated temperature readings to be lower than the actual bulk coolant temperature. In addition, the core exit thermocouples are monitored as an indication of natural circulation conditions and saturation margin.

9. An estimate of the radiation levels existing at the completion of the low power test program is very difficult due to the uncertainty in crud disposition. However, TVA has examined the implementation requirements stemming from the NRR Lessons Learned Task Force Kemeny Commission, and the Task Action Plan, and concludes that implementation of these requirements will not be precluded by this low power operation.

ENCLOSURE 3

OPERATING EXPERIENCE PROVIDED BY THE SPECIAL TEST PROGRAM

The following is a description of the operating experience provided by the special test program. It discusses the scheduling frequency and duration expected to accomplish the desired training objectives for each test. These objectives will be evaluated as the program progresses and changes will be made accordingly.

The schedule is arranged to start each shift with the basic Natural Circulation Test (Test 1) and progress to a more complicated test. Each operating shift is required to sign off on each test as shown in the attached Table 7 from the startup test sequencing document (S.U. 7.1).

Test 1: The Natural Circulation Test should be run at lease once and if time permits twice per shift. Only one group will perform the test on an eight hour shift. In this way each operator can participate in both entry into and exit from Natural Circulation and observe transient and steady state unit behavior.

Each group should perform this test before performing any other natural circulation test.

Test 9A: The Forced Circulation Cooldown Test is not designed to provide operator training, rather it gathers data for the Boron Mixing and Cooldown Test. Because of this objective, the test will be performed once. Since this is not a natural circulation test, the groups performing the test need not have performed Test 1.

Test 9B: Each operator group should have performed Test 1 before performing this test. This test will be performed twice. First, the schedule calls for three groups to cover two shifts. It is suggested the 1st shift start the natural circulation cooldown and cool down approximately 30°F. The float group should come in approximately four hours early to perform an additional 40°F cooldown while the day shift cools down the remaining 30°F. In this way all three shifts perform a natural circulation cooldown and will be exposed to the unit and instrument transient behavior. Next, the schedule calls for two groups to cover two shifts. The test should be started halfway through the shift, cooldown 70°F then turned over to the oncoming shift for the remaining 30°F.

The heat up portion of the test is intended to obtain additional data and provides no designed operator training function.

Test 8: The Establishment of Natural Circulation From Stagnant Conditions Test should be run at least once and if time permits twice per shift. Only one group will perform the test on an eight hour shift with the exception of the float group. They should perform the test following the test completion by the day shift. The float group may overlap into the evening shift to complete the test. In this way each group will be exposed to the problems associated with and the expected parameter responses associated with the initiation of natural circulation from a stagnant flow condition.

Test 3 & 5: Natural Circulation with Loss of Pressurizer Heaters Test and Natural Circulation at Reduced Pressure Test will be performed simultaneously. As a training tool, Special Test 3 will give the operators experience in controlling the saturation margin during depressurization using charging flow and S/G steam flow. Special Test 5 is actually a continuation of ST3 as far as a training experience is concerned. The same techniques for saturation margin control are used at the lower pressures. If subcooling in the pressurizer occurs, further experience will be gained because of the increased sensitivity of the RCS pressure to charging and letdown flow. In order for each operator to participate to the maximum extent possible, the two tests should be run together by only one group during an eight hour shift. An exception is that the float group will be brought in halfway through first shift to first observe and then near the end of the shift operate the CVCS. If necessary, they will continue through the second shift in order to meet the desired training objectives.

Test 4: Effect of Steam Generator Secondary Side Isolation on Natural Circulation Test will be performed in its entirity only once. The test duration will cover approximately 24 hours. The third shift will enter natrual circulation then first remove one steam generator and then another from service. The two S/G will be returned to service but natural circulation maintained. The off group will overlap and repeat the isolation-recovery process. This action will continue until each group isolates and unisolates two steam generators. Because of the number of items to be observed and the off normal system responses each group should perform all steps from 5.3 to 5.17.

Test 2: Natural Circulation with Simulated Loss of Offsite AC Power Test should be run as few times as possible because of the possibility of equipment damage, but still allowing all operations groups to observe and/or take part in the test. Actual system operations will be performed by the group responsible for shift coverage. Observer personnel will only observe. Because of the nature of

Test 2: (Cont.) this test, the training objective can be met as an observer. This is true since the major steps are verification of some automatic action. The major portion of the recovery is covered in an Emergency Operating Instruction and is practiced at the Training Center. The schedule calls for the test to be performed three times, two of which will have an observer group assigned to follow the test.

Test 7: Simulated loss of All Onsite and Offsite AC Power Test will be initiated only once. Because of the operational experience that can be gained by locally controlling the S/G, PORVS and the auxiliary feedwater system, every operations group should perform the local control function. The test will be initiated late on the evening shift and continue until all groups have participated. Following test initiation the on-shift operation group will obtain local control and maintain Wat Standby condition. After this initial performance, the 125-volt vital battery can be unloaded. As each new operations group prepares to take control the S/G PORVS and auxiliary feedwater system, the systems will be returned to the pre-recovery condition. In this way each operator will take manual control, adjust to the desired flow rate, and maintain the Steam Generator level and RCS temperature at the normal Hot Standby valves.

Test 6: Cooldown Capability of the Charging and Letdown Test will be performed by each operations group whenever the opportunity arises. The reactor is subcritical and the primary system is in hot standby.

TABLE 7

SEQUENCE OF STEPS FOR NATURAL CIRCULATION TESTING

NOTE: This sequence can be modified by the test director

Special Test #	Test Name	Shift Performance	Expected Duration (hr)	General Comments
1	Natural Circulation	Group 1 _____/_____	4	Special Test #1 should be run once for each of the five groups
		Group 2 _____/_____	4	
		Group 3 _____/_____	4	
		Group 4 _____/_____	4	
		Group 5 _____/_____ (Test Director)	4	The test director signs off each group upon completion of each test.
9A	Forced Circulation Cooldown	_____/_____	12 hrs.	Special Test #9A is a data gathering test. As such it will only be performed once.
9B	Boron Mixing And Cooldown	Group 1 _____/_____		Special Test #9B should be run twice. All five operations groups must participate to the extent that each performs enough at a natural circulation cooldown to understand the problems envolved and techniques required for a controlled cooldown rate.
		Group 2 _____/_____	8 hrs.	
		Group 3 _____/_____		
		Group 4 _____/_____	8 hrs.	
		Group 5 _____/_____		

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SEQUENCE OF STEPS FOR NATURAL CIRCULATION TESTING

NOTE: This sequence can be modified by the test director

Special Test #	Test Name	Shift Performance	Expected Duration (hr)	General Comments
8	Establish NC from Stagnant Conditions	Group1_____/_____ Group2_____/_____ Group3_____/_____ Group4_____/_____ Group5_____/_____ (Test Director)	8 8 8 8 8	Special Test 8 should be run twice. All five operations groups must participate in the stagnant start transient.
3	Natural Circulation With Loss of Pressurizer Heaters	Group1_____/_____ Group2_____/_____ Group3_____/_____ Group4_____/_____ Group5_____/_____ (Test Director)	Both Test 3 8 8	Special Test #3 and #5 should be performed sirultaniously. The test director may assign sub directors each responsible for a test. The test director is responsible for coordinati the test.
5	Natural Circulation at Reduced Pressure	Group1_____/_____ Group2_____/_____ Group3_____/_____ Group4_____/_____ Group5_____/_____ (Test Director)	8 8	
4	Steam Generator Isolation in NC*	Group1_____/_____ Group2_____/_____ Group3_____/_____ Group4_____/_____ Group5_____/_____ (Test Director)	 12 12	Special Test #4 should be run twice. All five Operations Groups must participate to the extent that each performs a steam generator isolation and reestablishment of natural circulation following the return of the S/G to service. *Possible SI

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TABLE 7

SEQUENCE OF STEPS FOR NATURAL CIRCULATION TESTING

NOTE: This sequence can be modified by the test director.

Special Test #	Test Name	Shift Performance	Expected Duration (hr)	General Comments
2	Natural Circulation With Simulated Loss of Offsite AC Power	Group 1_____/_____ Group 2_____/_____ Group 3_____/_____ Group 4_____/_____ Group 5_____/_____ (Test Director)	12 12 8	Special Test #2 should be run three times & ST #7 should be run once. All five Operations Groups must participate to the extent that each observes the unit response upon test initiation and performs some portion of the stabization and recovery operation.
7	Simulated Loss of All Onsite and Offsite AC Power	Group 1_____/_____ Group 2_____/_____ Group 3_____/_____ Group 4_____/_____ Group 5_____/_____ (Test Director)	12	ST #7 NOTE: After each shift performs the required stabilization function in manual return the component to auto then back to manual. In this way each crew establishes manual control.
6	Cooldown Capability if the Charging and Letdown	Group 1_____/_____ Group 2_____/_____ Group 3_____/_____ Group 4_____/_____ Group 5_____/_____	4 4 4 4 4	Special Test #6 can be conducted at various times through but the special test schedule in which hot shutdown conditions exist. All five operating groups should complete the test prior to concluding special test schedule.

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