

Westinghouse  
Electric Corporation

Water Reactor  
Divisions



Nuclear Technology Division

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NS-EPR-2465

July 8, 1981

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

SUBJECT: Revised Special Low Power Testing Program

Dear Mr. Denton:

It has come to our attention, through various means noted on Attachment 1, that the Commission will require all plants receiving an Operating License to perform a Special Low Power Testing Program for the purpose of operator training prior to escalation above 5% Rated Thermal Power. Westinghouse has been deeply involved in the development and performance of all such programs carried out to date and most of these programs planned for the near future (see listing of tests performed or planned in Attachment 2). As a result of this involvement Westinghouse believes that the majority of expertise existing in regards to this type of program lies within this organization.

Members of the Westinghouse staff involved with these programs have performed a continuous evaluation of the various programs to determine acceptability with regards to the program objectives, plant operation, availability, and plant safety. The outcome of this evaluation process has been the modification of several tests in the past, and the recent development of a revised training program which incorporates existing program objectives while decreasing the impact on plant operation and availability, and eliminates concerns about plant safety such that a Westinghouse/NRC safety evaluation would no longer be required.

Attachment 3 provides those tests that are required by item 4 of Attachment 1 for Watts Bar. Please note that several of the tests have been modified in the past to allow use of the Reactor Coolant Pumps (RCPs) to provide the heat input since the tests are really concerned with secondary side equipment manipulation. Attachment 4 provides a revised test program developed by Westinghouse as a result of our evaluation process. The proposed program differs from the current program only in how or when a specific training objective is met. The proposed program encompasses all of the plant characteristic demonstrations and tests while utilizing two tests currently required by Regulatory Guide 1.68 Revision 2, Initial Test Programs for Water-Cooled Nuclear Power Plants, or reference to a prototypical test as allowed by items 4 and 5 of Attachment 1.

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Page Two

Westinghouse believes that the revised test program proposed by Attachment 4 will achieve the same training objectives required by the Commission (see Attachment 5) but with significantly less impact on critical path testing, plant operation, plant availability, and most importantly, plant safety. None of the tests noted in Attachment 4 would require the defeat of any protection function when active fuel is present in the vessel. Elimination of this defeat requirement precludes the necessity for any in-depth safety evaluation by either Westinghouse or the NRC staff. This fact alone should demonstrate the superiority of the proposed test program to the current program, while maintaining the training objectives noted in Attachment 5. Based on this belief, Westinghouse requests that the proposed Special Low Power Test Program provided as Attachment 4 be reviewed by your staff for use by all future plants with a Westinghouse NSSS. Any questions you may have concerning this request or the attached may be addressed to D. W. Call, Manager, Plant Protection (412/373-5074), or R. W. Steitler, Manager, Operating Plant Analysis (412/373-4705). We will respond in as expeditious a manner as possible.

Very truly yours,



E. P. Rahe, Manager  
Nuclear Safety Department

CRT/kk  
Attachments

ATTACHMENT 1

1. NUREG-0694, "TMI Related Requirements for New Operating Licenses".
2. NUREG-0737, "Clarification of TMI Action Plan Requirements".
3. June 3, 1981, List of SER Open Items for Comanche Peak, open item number 91.
4. NRC letter to H. G. Parris, TVA, from R. L. Tedesco, NRC, dated June 16, 1981, concerning Special Low Power Testing for Watts Bar.
5. NRC letter to T. C. Nichols, Jr., South Carolina Electric and Gas Company, from R. L. Tedesco, NRC, dated November 14, 1980, concerning Clarification of TMI-Related Requirements for New Operating Licenses Requirement for Training During Low Power Testing for Virgil C. Summer.

ATTACHMENT 2

1. Tests performed at the following plants as of 6/30/81:

North Anna II  
Sequoyah I  
Salem II  
Farley II

2. Tests planned at the following plants:

Diablo Canyon I  
McGuire I  
Virgil C. Summer

3. Test program requirements specifically noted by the Commission are known for the following plants:

Comanche Peak  
Watts Bar

### ATTACHMENT 3

Current NRC required Special Low Power Test Program.

1. Place plant in natural circulation observing: length of time for plant to stabilize, flow distribution, power distribution, and ability to maintain this mode of cooling. Reduce pressure by turning off pressurizer heaters noting depressurization rate. Reduce pressure by use of auxiliary spray noting effect on depressurization rate and effect on margin to saturation temperature. At reduced pressure observe effect of changes in charging flow and steam flow on margin to saturation temperature.
2. Place plant in natural circulation, remove offsite power sources and operate plant utilizing batteries and emergency diesels. For this test one or more Reactor Coolant Pumps may be used to supply heat input to the secondary side instead of using natural circulation, per Salem II, Farley II tests.
3. Place plant in natural circulation, remove onsite AC power sources and operate plant utilizing manual control and steam driven Auxiliary Feedwater Pump. For this test one or more RCPs may be used to supply heat input to the secondary side instead of using natural circulation, per Salem II, Farley II tests.
4. After reactor trip from full power at end-of-life cycle 1 place the plant in natural circulation, borate to Cold Shutdown concentrations and cool the plant down to RHR switchover conditions.

#### ATTACHMENT 4

##### Westinghouse Proposal for a Revised Special Low Power Test Program.

1. During Hot Functional testing (or prior to fuel loading) with Reactor Coolant Pumps supplying heat input to the secondary side, remove onsite AC power sources and operate the plant utilizing manual control and steam driven Auxiliary Feedwater Pump.
2. After fuel loading, but prior to Initial Criticality, establish stable conditions at T<sub>no</sub> load and 2235 psig with one RCP in operation (RCP is not to be in loops with Pressurizer surge line or spray lines). Reduce pressure by turning off Pressurizer heaters noting depressurization rate. Re-establish heaters and reduce pressure further by use of auxiliary spray noting depressurization rate and effect on margin to saturation temperature. At reduced pressure observe the effects of changes in charging flow and steam flow on margin to saturation temperature.
3. Per requirements of Regulatory Guide 1.68 Rev. 2 (item 4.t), place the plant in natural circulation mode observing the length of time for plant to stabilize, flow distribution, power distribution, and ability to maintain cooling mode .
4. Per requirements of Regulatory Guide 1.68 Rev. 2 (item 5.j.j), perform Loss-of-Offsite Power/Station Blackout test with plant trip from 10-20% Rated Thermal Power. Operate plant establishing stable conditions in natural circulation using batteries and emergency diesels.
5. Referencing boration and cooldown tests performed at Sequoyah I, North Anna II, Farley II, and Diablo Canyon I verify similar plant response by parameter and plant comparison. Operator training for cooldown on natural circulation provided on plant simulator at the earliest opportunity.

ATTACHMENT 5  
TEST PROGRAM OBJECTIVES

	Satisfied by Current Program	Satisfied by <u>W</u> Proposed Program	Satisfied by Simulator with Verification
1. Observe Natural Circulation	1 <sup>†</sup>	3 <sup>††</sup>	*
a) stabilization time	1	3	*
b) flow distribution	1	3	*
c) power distribution	1	3	*
d) maintain adequate cooling	1	3	*
2. Observe depressurization rate without pressurizer heaters	1	2	*
3. Observe depressurization rate with auxiliary spray	1	2	*
4. Observe effect of changes in charging flow on T <sub>sat</sub>	1	2	*
5. Observe effect of changes in steam flow on T <sub>sat</sub>	1	2	*
6. Maintain stable plant conditions utilizing battery and emergency diesel power supplies only	2	4	*
7. Maintain stable plant conditions utilizing steam driven auxiliary feedwater pump and manually actuated equipment only	3	1	*
8. Borate plant while in natural circulation	4	5*	*
9. Cooldown plant while in natural circulation	4	5*	*
10. Plant Procedure Verification	very limited	some-what limited	some-what limited

+ Test number of Attachment 3 where objective is covered

++ Test number of Attachment 4 where objective is covered

\* Control Room Operator training objective may be met by use of control room simulator with performance of verification test at plant or verification of simulator with previously performed Special Low Power Tests.