TENNESSEE VALLEY AUTHORITY
KNOXVILLE, TENNESSEE 37902

OFFICE OF THE BOARD OF DIRECTORS

December 3, 1979

Joseph M. Hendrie, Chairman
U.S. Nuclear Regulatory Commission
1717 H Street, NW.
Washington, DC

Dear Chairman Hendrie:

We believe that there are advantages to be gained by pursuing certain limited activities in the case of those power plants where construction has been completed during the Commission's "pause" in issuing new construction permits and operating licenses, particularly where it can be demonstrated that the owner utility has taken the initiative in improving and promoting safety. We believe that the TVA program meets or exceeds the recommendations of the President's Commission and the NRC staff's short term lessons learned requirements. You will recall that TVA completed a detailed review of our nuclear program in May. TVA has implemented a series of major improvements as a result of that review. More recently, a special TVA nuclear safety task force has completed a review of the report by the President's Commission. This task force concluded, and we agree, that TVA meets all of the recommendations of the Kemeny commission report.

We are therefore asking that the NRC permit certain activities including fuel loading, zero power physics testing, "special" testing and operator training to be conducted at the Sequoyah Nuclear Plant unit 1.

We believe that using the Sequoyah unit to conduct tests of the natural circulation cooling phenomena is particularly advantageous at this time. There are questions about this mode of cooling under normal and degraded conditions which can be resolved by full scale demonstration testing. Since the fuel in the reactor at Sequoyah would not have been operated at significant power, the inventory of fission products present would be minimal.

We believe that significant testing and operator training can be performed which would permit operation of the reactor at no greater than five percent power. A summary description of the type of tests which TVA could perform is included as Enclosure 1.

Construction necessary for fuel loading was completed at Sequoyah unit 1 on November 15, 1979. The NRC staff has completed the review of the operating license application with the exception of items related to Three Mile Island. The TVA response to the NRC Staff Short Term Lessons

Learned was submitted September 7, 1979, and your staff has been working with TVA to resolve these issues. Enclosed for your information are the TVA responses to the President's Commission on the Accident at Three Mile Island recommendations.

Our fuel loading and zero power testing would take approximately six weeks. We would then be able to begin special testing in mid-February. Should events in the interim dictate that modifications to the plant are required, the nuclear fuel could be removed from the reactor vessel and stored in the spent fuel pool with no hazard to the public health and safety.

Additionally, we know you will be interested to know that TVA has initiated a comparative risk analysis of the Sequoyah plant auxiliary feedwater system. This analysis will be complete by the time the proposed low power tests are finished. In addition, we are evaluating other areas of the Sequoyah plant where meaningful risks assessments could be completed before full power operation.

Very truly yours,

Dave Freeman

S. David Freeman
Chairman of the Board

Enclosures

Enclosure 1

SEQUOYAH NUCLEAR PLANT UNIT 1

SUMMARY OF SPECIAL TESTS

Prior to core loading, the plant nuclear instrumentation and temporary nuclear instrumentation will be checked out. Plant systems requiring boration will be borated to the specified concentration.

Following core loading and prior to initial criticality, baseline testing will be performed with the core completely assembled. Major items to be performed are moveable detector system checkout, rod drive mechanism and rod cluster control assembly operation tests, reactor internal vibration measurements, pressurizer system optimization and reactor coolant loop flow coastdown measurements.

After the reactor is brought critical, low power physics testing will begin. Plant baseline parameter measurements will be taken, reactivity measurements conducted, temperature coefficients determined, and boron endpoint measurements made. Reactivity measurements include integral and differential bank worth tests, minimum shutdown margins verification, and determination of the affect of a rod ejection.

These tests are the normal tests performed to verify that integrated system response meets design assumptions, verify the core design basis, and verify that adequate shutdown margin exists throughout cycle 1.

They are described in more detail in the Sequoyah Nuclear Plant Final Safety Analysis Report.

The following special tests conducted prior to exceeding 5 percent power are intended to provide a significant demonstration of reactor operation in the natural circulation mode under both normal and certain degraded conditions. These tests will also provide significant operator training and experience under these conditions. The tests will be repeated such that each operating shift participates in each test.

To simulate decay heat, the reactor will be operated at less than 5 percent power with the reactor coolant pumps tripped. This mode of operation will closely approximate natural circulation conditions (with subcooling) following a reactor trip from full power after several months of power operation.

Since detailed test procedures and safety evaluations for these tests have not been completed, some modifications in test scope or detail may be required. Test durations and methods of power level control will be provided in the detailed test procedures and evaluation. Once test procedures have been written and corresponding safety evaluations developed for the special tests, they will be submitted to NRC along with appropriate license amendments. We intend to have Westinghouse Electric Corporation review these special test procedures as they are doing with other selected emergency procedures.

I. Natural Circulation Verification

Purpose

Verify establishment of natural circulation in the primary system

Initial Conditions

Reactor Coolant Pumps operating

Steam Generators being fed by normal feedwater supply

Pressurizer Heater controlling pressure

Reactor Power Z 3%

Normal primary system temperature and pressure

Test Description

Test will be initiated by tripping of all reactor coolant pumps. Operator will verify establishment of natural circulation by observing response of the hot leg and cold leg temperature instrumentation in each loop. Core exit thermocouples will be monitored to assess core flow distribution.

II. Natural Circulation with Simulated Loss of Offsite Power

Purpose

Verify that natural circulation cooling can be established and maintained following loss of offsite power.

Initial Conditions

Reactor Power 1%.

Reactor Coolant Pumps operating.

Auxiliary Feed System operating on offsite power.

Pressurizer Heaters controlling pressure.

Normal primary system temperature and pressure.

Test Description

Test will be initiated by a simulated loss of offsite power. Reactor coolant pumps will be tripped, auxiliary feed pump and pressurizer heater loads will be transferred to diesel power. Operator will verify establishment of natural circulation by observing response of hot leg and cold leg temperature instrumentation in each loop. Core exit thermocouples will be monitored to assess the core flow distribution.

III. Natural Circulation with Loss of Pressurizer Heaters

Purpose

Verify establishment of natural circulation and determine the rate of decrease of margin to saturation while in this mode and the ability to reestablish margin through cooldown and makeup.

Initial Conditions

Reactor Power Z 3%

Reactor Coolant Pumps operating

Secondary system steam flow adjusted to maintain constant primary coolant temperature

Steam generators being feed by normal feedwater supply

Pressurizer heaters controlling pressure

Test Description

Test will be initiated by tripping pressurizer heaters and reactor coolant pumps. Establishment of natural circulation will be verified by observing response of hot leg and cold leg temperature instrumentation in each loop. Core exit thermocouples will be monitored to assess the core flow distribution. The operator will observe the saturation meter to verify margin. Prior to reaching saturation, secondary side steam flow will be increased to affect cooldown and reestablishment of saturation margin will be verified. In conjunction with cooldown, the operator feeds the primary system to compensate for shrinkage.

IV. Effect of Steam Generator Isolation (Secondary Side) on Natural Circulation

Purpose

Verify the effects of steam generator isolation (secondary side) on natural circulation.

Initial Conditions

Reactor Power 3%

All steam generators fed by normal feedwater supply

Reactor coolant pumps on

Secondary system steam flow adjusted to maintain constant temperature

Test Description

Trip reactor coolant pumps and verify establishment of natural circulation. Cooldown using steam dumps to provide sufficient margin to steam generator safeties. Isolate steam generators one at a time until three are isolated or primary system temperature starts to increase. Hot and cold leg temperatures will be monitored to ensure that sufficient heat is being removed by the natural circulation process. The steam generators will be returned to service one at a time and the reestablishment of natural circulation

will be verified in each loop. Core exit thermocouples will be monitored to assess core flow distribution.

V. Natural Circulation at Reduced Pressure

Purpose

1) Verify operation and test accuracy of primary system saturation meter.
2) Provide operations personnel with online experience in using saturation meter to monitor and control margin to saturation.
3) Provide operational verification so that changes in saturation margin will not affect natural circulation provided adequate margin to saturation exists.

Initial Conditions

Reactor Power Z 3%

Reactor coolant pumps operating

Steam generators being fed by normal feedwater supply

Pressurizer heaters controlling pressure

Reactor coolant system pressure normal

Secondary system steam flow adjusted to maintain constant temperature

Test Description

Test is initiated by tripping of reactor coolant pumps and verifying establishment of natural circulation. Primary system pressure will be reduced as primary system temperature is held constant. Accuracy of saturation meter will be verified during pressure reductions. The effect of each pressure reduction on natural circulation will

be observed. Core exit thermocouples will be monitored to assess core flow distribution.

VI. Determine the cooldown capability of the charging and letdown system

Purpose

Determine the cooldown capability of the charging and letdown system with the secondary plant isolated.

Initial Conditions

Reactor shutdown

Pressurizer heaters controlling pressure

Reactor coolant pumps running

All steam generators fed by normal feedwater flow

Test Description

Trip three reactor coolant pumps. Cooldown using steam dumps to provide margin to steam generator safeties. Isolate all steam generators. Establish charging and letdown for maximum cooling capability. Verify the cooldown capability of the charging and letdown system from the hot and cold leg temperatures in the active loop. This will be accomplished by periodically interrupting feed and bleed to permit heatup. Core exit thermocouples will be monitored to assess core flow distribution.

VII. Simulated Loss of All Onsite and Offsite AC Power

Purpose

To verify:

1. Hot standby conditions can be maintained,
2. Auxiliary feedwater can be controlled by manual means; i.e., with loss of AC power and control air,
3. Critical plant operations can be performed using emergency lighting,
4. Ability of 125-volt battery to supply 125-volt vital AC, and
5. Selected equipment areas do not exceed maximum design temperature.

Initial Conditions

Reactor critical at N1 percent power.

Reactor Coolant Pumps operating.

Pressurizer heaters controlling primary system pressure.

Test Description

Test will be initiated by:

1. Tripping RCP's and pressurizer heaters,
2. Tripping auxiliary building and control building lighting boards,
3. Removing AC power from auxiliary feedwater components and main steam power reliefs,
4. Tripping selected space and equipment coolers,
5. Tripping vital battery chargers and AC power to inverter,
6. Isolating main feedwater and main steam lines,
7. Establishing manual control of auxiliary feedwater,
8. After two hours, terminating the test by restoring AC power and returning equipment to normal service,
9. Shutdown reactor, and
10. Cooling down primary system and placing RHR system in service.