UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

APR 10 1980

Docket No.: 50-327

Mr. H. G. Parris
Manager of Power
Tennessee Valley Authority
500A Chestnut Street Tower II
Chattanooga, Tennessee 37401

Dear Mr. Parris:

SUBJECT: REQUEST FOR INFORMATION ON SEQUOYAH UNIT NO. 1

Enclosure 1 is the list of requests for information on the low power test program that was provided informally to your staff during the discussion on the proposed program.

Enclosure 2 is the list of questions from R. Savio, Staff Engineer, for the ACRS. These items will be discussed at the next ACRS Subcommittee, tentatively scheduled for April 28th. Although some of tne questions are directed to the NRC staff, we request that you respond to all the listed items, to the extent possible, in order to assist us in the review of this matter. A response by April 22, 1980 would be appreciated.

Please call if there are questions.

Sincerely,

L. S. Rubenstein

L. S. Rubenstein, Acting Chief
Light Water Reactors Branch No. 4
Division of Prcject Management

Enclosures:
As stated

cc w/enclosures:
See next page.

Tennessee Valley Authority

ccs:
Herbert S. Sanger, Jr. Esq.
General Counsel
Tennessee Valley Authority
400 Commerce Avenue
E 11B 33
Knoxville, Tennessee 37902

Mr. E. G. Beasley
Tennessee Valley Authority
400 Commerce Avenue, 249A HBB
Knoxville, Tennessee 37902

Mr. Michael Harding
Westinghouse Electric Corporation
P. O. Box 355
Pittsburgh, Pennsylvania 15230

Mr. David Lambert
Tennessee Valley Authority
400 Chestnut Street Tower II
Chattanooga, Tennessee 37401

Mr. J. F. Cox
Tennessee Valley Authority
400 Commerce Avenue, W10C131C
Knoxville, Tennessee 37902

Resident Inspector/Sequoyah NPS
c/o U.S. Nuclear Regulatory Commission
P. O. Box 699
Hixson, Tennessee 37343

ENCLOSURE 1
SEQUOYAH SPECIAL TESTS

1. Based on discussions during our meeting with TVA personnel on January 11, 1980, it is our understanding that the procedures for the special low power tests you submitted are not intended to be self-sufficient. Instead, the special procedures also require use of the normal plant operating procedures, the plant technical specifications, and special test exceptions to the technical specifications. This approach has the advantage of providing additional operator training in the use of these normal plant procedures, but does make the operators' duties more complex during the low power test program. Other potential difficulties include possible conflicts or ambiguities between the special procedures and the normal operating procedures, lack of clear instructions to the licensed operators regarding the actions they should take if specified limits are exceeded during testing, and any ambiguity as to the responsibility and authority of the licensed operators relative to that of the test director.

   The staff has concluded that TVA should prepare some type of lead or master document. This document should:

   a. Include an outline of the entire test program, defining the sequence in which the individual tests will be performed.

   b. Specify, for each individual test, which conditions should be established or maintained, and what orders or instructions apply during the period the test is being performed, including the applicable emergency procedures if an Acceptance Criterion is exceeded.

   c. Specify that at the conclusion of each individual test that normal technical specifications and licensed plant conditions, including safety system settings, apply. There may be some exemption for a specified short time period if the same test is planned to be repeated.

   d. Specify that the plant administrative procedures will be followed when tests are being conducted so there will be no doubt that the licensed senior operator has the authority and responsibility to direct the licensed operators in accordance with 10 CFR 55.4e.

   Please provide for staff review a lead or master test document that covers the items listed above.

2. The following comments and questions on the procedures for the special tests apply to all of the special tests:

   a. Prerequisites should refer to any special arrangements of the plant that are not the same as called for by the normal operating procedures. For example, any systems that require valve lineups that are different from normal should be noted in prerequisites.

   b. Why are only 4 in-core thermocouples to be recorded on the trend recorder? If there is the capability to record more this should be done.

c. In Appendix C, page 9, K0791 is stated to be equal to 0.075. This number is based on four pumps operating. We suspect this number will change under low flow conditions. Will this invalidate the tests or give the operator an erroneous picture of what is happening?

d. The special test procedures and test exemptions should be thoroughly reviewed relative to the normal operating procedures and technical specifications to assure that there are no ambiguities that will arise during testing.

e. Item 2.20 of Test #7 requires evacuation of construction personnel. Consideration should be given, in conducting other tests, to evacuating people from those areas in which they might, accidentally or otherwise, jeopardize safe operation or satisfactory test performance.

f. Where there are several valves to be operated in a single step, such as in item 5.10 of Test #7, there should be a signoff for each valve: This will help prevent missing a necessary valve movement. The same philosophy should be applied to similar multiple equipment condition changes.

g. Some notes and cautions are included in the procedures for some tests which appear equally applicable to the other tests. These should be included in all the tests.

3. The following questions and comments apply to the procedures for the specific tests noted:

a. Test 2. Item 2.13 should specify the diesels to be cold so that their response is more typical of what would be expected in an accident. Item 5.24 should specify which header is to be verified as being warm.

b. Test 3. (1) Item 5.11 should state the direction (increase or decrease) of change of charging flow and steam flow required to increase the saturation margin.

(2) Item 6.4, if satisfactorily achieved, should be the basis for preparing, later, a standard operating procedure for future use.

c. Test 7. (1) Item 5.67 discusses blocking of safety injection between tests. The approach TVA has taken appears to be non-conservative in that there may be significant time that passes between tests, thus leaving the plant without complete safety protection. When the end of the test is declared, the plant should be placed back into a condition that satisfies the applicable Technical Specification and other license conditions. See Question 1.c.

(2) Reference to the fourth sheet of Data Sheet 5.2 should be made in the procedure to assure that Battery Room conditions are maintained and checked at the required frequencies.

d. Test 8. (1) Items 2.6 and 2.7 permit disabling of two reactor trips. What trips remain operable?

(2) Item 2.9.2 indicates that the reactor power and intermediate range channels will be monitored at 5-minute intervals. We suggest they be monitored much more often, preferable continuously.

(3) Item 2.10 indicates that 3 in-core thermocouples will be monitored. All other tests use 4 thermocouples. Please explain this inconsistency.

(4) Concerning the note following item 5.16, see our comment concerning Item 5.67 of Test 7 and Question 1.c.

e. Test 9A. From Item 2.5 it appears that the reactor coolant flow rates in loops 3 and 4 are not being recorded. Why not?

4. The low power test program you have proposed for Unit 1 of Sequoyah includes a number of natural circulation tests with single phase flow. Each of the operating crews will obtain "hands-on" experience in performing each test, which we agree will provide useful training. However, we are concerned that this emphasis on single phase natural circulation will cause the operators to believe that this is the only condition that they would encounter following an accident. We need the following information to determine if our concerns are valid.

a. Is there a small or intermediate size LOCA (including a stuck open PORV) that would require heat transfer using the steam generator to remove decay heat and yet discharge enough reactor coolant inventory such that two phase conditions would exist in the RCS? Your response should consider situations where there are no single failures as well as cases where one ECCS train is partially or totally inoperable.

b. If the answer to item (a) is yes, describe the training given to the operators to cope with this situation.

5. Provide your schedule for submitting a safety analyses for each special test of your proposed low power test program.

6. You have verbally agreed to perform tests to obtain base line data regarding differential pressure across the elbow pressure taps in each reactor coolant loop for various pump combinations. These tests should be conducted at isothermal conditions with the core installed, but all control rod assemblies inserted. The reactor coolant system should be at about normal operating temperature and pressure. The tests should be performed with one pump, two pumps and three pumps operating. The differential pressure data should be obtained in all four loops; that is, the loops with flow in the noraml direction and the loops that have flow in the reverse direction. Pump data such as motor current and rpm (if possible) should be recorded. Confirm your commitment to perform these tests and provide a brief test procedure for staff review.

7. There may be the need to perform some hot isothermal, zero power tests to measure such items as normal system heat loss and rate of pressure decay due to heat losses in the pressurizer in order to be able to correctly interpret the data from the test proposed. For example, in test 6, the experimentally determined change in the temperature of the reactor coolant will reflect the algebraic sum of the pump energy input, the heat losses through the insulation, and the heat removal capability of the charging and letdown system. Please review your overall test program and determine if there is a need to perform such supplemental tests.

8. The instruments for measuring hot leg and cold leg temperatures may be subject to significant errors at the low flow rates that will exist during natural circulation. Under these flow conditions, heat losses to the environment through the instrument mounts, combined with low heat transfer coefficients at the sensor might lead to indicated temperature readings that are much lower than the actual bulk coolant temperature. This may make the control of the tests more difficult than anticipated.

Provide a description of the means you will use to confirm the accuracy of the hot and cold leg temperature measurements, or alternate means of controlling these temperatures during testing. If the cold leg temperature measurement will be confirmed by using the temperature of the saturated fluid on the shell side of the steam generator, how will local subcooling, due to feedwater addition near the outlet of the U-tubes be controlled or limited?

9. Provide an evaluation which demonstrates that the radiation levels that will exist after the low power test program is completed (including that from crud deposits) will not preclude implementation of requirements stemming from the NRR Lessons Learned Task Force, Kemeny Commission, Rogovin Commission or Task Action Plan.

ENCLOSURE 2

QUESTIONS REGARDING THE LICENSING OF THE SEQUOYAH PLANT

1. The general subject of the nitrogen in the UHI accumulator tank is of some interest. The nitrogen is prevented from entering the primary system by active means (series valves). What is the reliability which is associated with this system and what would be the effect of ingesting large quantities of this gas in the primary loop after a very small break in the primary system or after a massive cooldown following a main steam line break with failure being failure to cut off the main feedwater. Vortexing/gas ingestion in the UHI tank would provide another mechanism for transferring gas into the primary system even though the valves closed on signal. What would be the uncertainty associated with the measures taken to prevent this event (hardware used and the tests results and analysis used to determine setpoints).

2. To what extent has the NRC reviewed the details of the design of the auxiliary control room, its capability for overriding the control room functions, and the vulnerability of the auxiliary control room to the events which would cause the loss of functions for the main control room.

3. What are the reliability classes for the readout/indicating equipment in the control room? Would the operator have a clear indication of the status of the plant under emergency conditions? How is operator action, in the event of conflicting instrument indications, treated in the procedures?

4. Scenarios have been identified in which the ice condenser containment compartment drains may be plugged. Has the additional structural load which would result from water accumulation been considered?

5. To what extent is the ice condenser containment vulnerable to dynamic/-static loadings which would result when the external pressure is higher than the interior pressure? For what events would this type of load be significant?

6. Discuss the testing/analysis which has gone into establishing the operability of the containment purge valve. What uncertainties would be associated with the operability of this system? Are the dynamic forces on the ducting which are associated with the purge valve closure significant? What physical tests are required?

7. To what extent has the release of radioactivity from the containment into the auxiliary building during an accident by way of penetration/seal failures been considered? How would access to the auxiliary building and adjacent structures be affected? What capability exists for short term cleanup? To what extent is the control room environment protected from this and other accidents having potential consequences beyond the design bases?

8. To what extent are the pressurizer heaters and associated support equipment environmentally qualified for accident conditions? To what extent are the PORVs and associated equipment on primary-secondary systems environmentally qualified for accident conditions?

9. The following questions apply to conditions during the base design flood:
   a. To what extent is the decay heat removal process dependent on natural convection and will the TMI-2 experience lead to any change in the method for dealing with this event?
   b. Would the flood condition result in a release of any combustible fluids or toxic gases which are stored at the plant? How are these materials controlled to prevent fire and other damage?

10. To what extent were plant design engineers involved in the writing of the emergency procedures?

11. To what extent has TVA, independently of Westinghouse, looked at the use/design of the UHI? What does TVA believe are the advantages/disadvantages of the UHI in a base loaded plant?

12. Discuss the capability of the plant to withstand the loss of all AC power.

13. Discuss the relative reliability of the various subsystems within the DC power system. Does the redundancy in the number of banks of batteries extend through the whole system? Are there cases, even with a large number of batteries, where certain redundant safety systems are served by just two batteries? Are such systems normally on critical duty? To what extent has the potential for other systems in the plant for causing failures of the DC power system been looked at?

14. Is it clear in light of the TMI-2 experience that the decay heat can be removed from the core without serious core damage after loss of the secondary loop? What additional improvements could be made in existing primary side hardware which would increase the reliability of the decay heat removal process without assisance from the secondary loops? Some specific topics to be considered would be improvements in the PORV system and pilot motors (on emergency power) on the reactor coolant pumps.

15. Westinghouse has claimed that a significant capabiliy exists for the "sweepout" of noncondensible gases for high points in the primary system during the natural convection process. What plans exist for the experimental demonstration of this phenomena?