TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

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JUN 10 1981
U.S. NUCLEAR REGULATORY COMMISSION

June 5, 1981

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Chief
Licensing Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Ms. Adensam:

In the Matter of the Application of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328
		50-390
		50-391
		50-438
		50-439

In response to Generic Letter 81-04 on Emergency Procedures and Training for Station Blackout Events, we are enclosing a response for Sequoyah Nuclear Plant.

The generic letter also addressed applicants for operating licenses. The operator training and operating procedures for Watts Bar and Bellefonte Nuclear Plants are not fully implemented at this time; however, the training and procedures will be similar to those utilized at Sequoyah. We will continue to address this generic issue and will provide an additional response after resolution of the NRC review of the Westinghouse guidelines.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Regulation and Safety

Sworn to and subscribed before me
this 5th day of June 1981
Paulette H. White
Notary Public
My Commission Expires 9-5-84

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Enclosure

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ENCLOSURE

SEQUOYAH NUCLEAR PLANT
STATION BLACKOUT EVENT
GENERIC LETTER 81-04

In response to generic letter 81-04 with respect to Sequoyah Nuclear Plant units 1 and 2, we have reviewed our design basis, safety systems, emergency procedures, and training program. In addition, we have investigated previous loss of offsite power events at other plants throughout our system to determine an experience base for recovery from such events. Furthermore, the Westinghouse Owners' Group has authorized Westinghouse Electric Corporation to proceed with the development of a generic guideline for loss of all ac power.

In respect to our design, we have never been required to consider a concurrent loss of offsite and onsite ac power as a design basis event. The operating history of our offsite ac power supplying our nuclear plants is one of high reliability because of the location and design of our grid. The Sequoyah Nuclear Plant is connected into a strong existing transmission network supplying large load centers. One unit is connected into the 500-kV transmission network and the other unit is connected into the 161-kV transmission system.

Four 500-kV transmission lines connect one generating unit into the 500-kV system. These connections consist of an 85-mile transmission line to Georgia Power Company's Bowen Plant, a 49-mile transmission line to the Widows Creek Steam Plant, and two transmission lines to the Watts Bar Nuclear Plant. In the vicinity of Sequoyah, the lines are on rights of way which are sufficiently wide to preclude the likelihood of failure of one line causing failure of the other.

Preferred electric power to the emergency buses at Sequoyah is supplied by two physically and electrically independent connections from the Sequoyah 161-kV switchyard to the onsite electrical distribution system. The 161-kV switchyard is the terminus for the second nuclear unit, the 500-kV intertie bank, and nine 161-kV transmission lines. Five of the 161-kV transmission lines terminate on one bus section and the other four transmission lines terminate on the other bus section. As a result of the strong 161-kV transmission network, any one of the 161-kV transmission lines terminating at Sequoyah has sufficient capacity to supply essential shutdown power. Because of the importance of offsite power to our nuclear plants, we have already developed operating procedures for restoring offsite power to our nuclear plants in the unlikely event of a system upset or temporary loss of grid.

During our special test program at Sequoyah on unit 1, Special Test #7, "Simulated Loss of All Onsite and Offsite AC Power," was performed. The objectives of this test were as follows.

1. To demonstrate that following a loss of all onsite and offsite power, including the emergency diesel generators, the decay heat can be removed by natural circulation using the auxiliary feedwater system in manual mode.

2. To verify that hot standby conditions can be maintained by manual control of the auxiliary feedwater system.

3. To verify that critical plant operations can be performed using emergency lighting, that the 125-volt dc vital battery has the ability to supply the 125-volt ac vital loads, and that certain equipment areas do not exceed maximum design temperatures.

4. To provide operator training.

The results of the special testing program, including this test, have been submitted to the staff. The results of the test were favorable and the objectives were met. Furthermore, our training program for Sequoyah and Watts Bar Nuclear Plants has already incorporated the results of this test. This includes classroom simulator training.

The following addresses your concerns raised in generic letter 81-04.

1. The actions necessary and equipment available to maintain the reactor coolant inventory and heat removal with only dc power available, including consideration of the unavailability of auxiliary systems such as ventilation and component cooling.

   Special Test #7, "Simulated Loss of All Onsite and Offsite AC Power," has addressed this item. The test was conducted by tripping the reactor coolant pumps along with all normal auxiliary building lighting, vital instrument power, ventilation in the main control room and turbine-driven auxiliary feedwater pump room, pressurizer heater, reactor coolant system charging and letdown, the motor-driven auxiliary feedwater pumps and the main feedpump in operation. All motor- and air-operated valves were assumed inoperable (the air accumulators on the auxiliary feedwater valves were assumed operable until its air charge ran out) and only vital instruments, powered by the emergency battery system, were used for the duration of the test. The turbine-driven auxiliary feedwater pump supplies its own cooling water, therefore it is self-sufficient under loss of all ac power. Furthermore, Westinghouse is in the process of performing further work in this area.

2. The estimated time available to restore ac power and its basis.

   TVA has done some work in this area as discussed in our submittal on the results of the special test program. Westinghouse is in the process of performing further work in this area.

3. The actions for restoring offsite ac power in the event of a loss of the grid.

   We have already developed plant emergency operating procedures for ensuring prompt restoration of offsite power to Sequoyah in the unlikely event of a system malfunction or loss of grid. For Sequoyah, the preferred offsite power is the Chickamauga Sequoyah 161-kV lines #1 from Chickamauga Hydro Plant, and the alternate is the Watts Bar Sequoyah 161-kV line from Watts Bar Hydro Plant.

4. The actions for restoring offsite ac power when its loss is due to postulated onsite equipment failures.

   The restoration of offsite ac power when its loss is due to postulated onsite equipment failures is highly dependent upon the exact sequence of events and resultant damage to equipment. Each of the events would be unique and each would require unique operator action to restore power. Our operator training program and operator experience with offsite power activities provide the necessary basis for prudent operator action. A general procedure for these events would be inappropriate.

5. The actions necessary to restore emergency onsite ac power. The actions required to restart diesel generators should include consideration of loading sequence and the unavailability of ac power.

   Operating procedures exist for manual startup of the diesel generators. When voltage is lost from a 6.9-kV shutdown board, the diesel generator will automatically start, if not already running, and tie itself to the board. The load sequencing will then begin loading the diesel generator. If the diesel generator trips off of the 6.9-kV shutdown board for some reason, it will automatically go through the same starting sequence once the fault if cleared. Also, if an operator manually tied a diesel generator to a dead 6.9-kV shutdown borad, it would still go through load sequencing. As stated in our above position, events causing a station blackout are unique and would require unique resolution if automatic starting fails.

6. Consideration of the availability of emergency lighting and any action required to provide such lighting in equipment areas where operator or maintenance actions may be necessary.

   One of the purposes of Special Test #7, "Simulated Loss of All Onsite and Offsite AC Power," was to verify that critical plant operations can be performed using emergency lighting. The result of this criteria was satisfactory. The lighting is initiated automatically and requires no operator action. For equipment areas where maintenance may be required, portable hand-held lighting can be used; therefore, no additional training, procedures, or equipment are required.

7. Precautions to prevent equipment damage during the return to normal operating conditions following restoration of ac power. For example, the limitation and operating sequence requirements which must be followed to restart the reactor coolant pumps following an extended loss of seal injection water should be considered in the recovery procedures.

   Westinghouse is in the process of performing further work in this area.

In summary, we do not believe that concurrent loss of offsite and onsite ac power should be considered as a design basis event. At the present time, however, our current plant procedures and training should be adequate to handle this event. The Westinghouse Owners' Group, as stated in its letter (OG-56) from R. W. Jurgensen to D. G. Eisenhut dated April 9, 1981 on the above subject, envisions guidelines submitted to NRC by September 1, 1981 with an owners' group seminar presentation on or about October 1, 1981. We will review our plant procedures after Westinghouse has completed the development of a generic guideline for loss of all ac power.