ENCLOSURE

SAFETY EVALUATION OF PROPOSED CHANGES TO TECHNICAL SPECIFICATIONS OF OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3

AUXILIARY ELECTRICAL SYSTEMS AND EMERGENCY POWER SYSTEM SURVEILLANCE AND PERIODIC TESTING

I. INTRODUCTION

The Duke Power Company, by letters dated January 12, 1978, February 1, 1978, and August 22, 1979, submitted a request for amendments to the Technical Specifications related to the auxiliary electrical systems and emergency power system periodic testing for Oconee, Units 1, 2, and 3.

The proposed changes are to:

1. Provide the definition of the emergency power supply system;

2. Provide flexibility in the limiting conditions for operation and surveillance requirements for the 125 Vdc systems;

3. Change the inoperable conditions in terms of the time period from 24 hours for each constitutent to 72 hours for one complete single string of the 125 Vdc system;

4. Reword the descriptions of the dc system capacity; and

5. Revise the periodic testing and surveillance of the emergency power sources.

II. BACKGROUND

The offsite power system (see FSAR Figure 8-2) for Oconee Nuclear Power Station, Units 1, 2, and 3 consists of six 230 kV transmission lines to the 230 kV station switchyard and two 500 kV transmission lines to a 500 kV switchyard. The 500 kV switchyard is connected to the 230 kV switchyard via an auto transformer. Offsite power is available to each of the three Oconee units via 230/4.16 kV startup transformers. The switchyards are arranged in breaker-and-a-half configuration and each circuit breaker is provided with dual trip coils supplied from 125-V dc station switching power systems which are independent from the Oconee unit's Class 1E dc systems. The circuit protection is provided by redundant relaying.

Onsite power is provided by two 87.5 MVA hydroelectric generators. This power is available either through the 230 kV switchyard and the 45/60 MVA startup transformers or through a 13.8 kV underground feeder which utilizes its own 12/16/20 MVA transformer (Transf. No. CT4) and supplies two 4160 V main feeder buses in each of the three units. The maximum emergency power demand upon initiation of accident conditions would be 4.8 MVA per unit.

Three divisional 4.16 kV buses per unit are provided for engineered safety feature loads. The divisional buses of each unit can be connected to either of their respective 4.16 kV main feeder buses. The sources of power which are automatically connected to the main feeder buses, in the order that they are connected, are:

1. The 230 kV switchyard via each unit's startup transformer;

2. The preselected hydro unit via the 13.8 kV underground feeder and the station's standby buses; and

3. The other hydro unit via a 230 kV overhead lines, the 230 kV switchyard and each unit's startup transformer.

Also, the following sources of power or startup transformers can be made available manually:

1. One of the gas turbines located 30 miles away at the Lee Steam Station via an independent overhead 100 kV transmission system and the station's standby buses; and

2. The three startup transformers can be manually cross connected via the station's emergency startup buses.

The use of the Keowee Hydro Station and power supply transmission lines including transformers which have been under the direct control of the Oconee Nuclear Power Station was originally reviewed and found acceptable as the stand-by emergency power supply for the Oconee Station during the operating license review.

III. ACCEPTANCE CRITERIA

The criteria that were applied in determining the acceptability of the Technical Specification changes for the ac and dc onsite power supply systems are:

1. General Design Criterion (GDC 17), "Electrical Power Systems," of Appendix A, 10 CFR Part 50;

2. IEEE Std. 308-1974, "Class 1E Power Systems for Nuclear Power Generating Station";

3. IEEE Std. 338-1975, "Periodic Testing of Nuclear Power Generating Station Class 1E Power and Protection Systems";

4. 10 CFR Part 50, Section 50.36 (C) (2), "Limiting Conditions for Operation":

5. Regulatory Guide 1.93, "Availability of Electric Power Sources";

6. Regulatory Guide 1.108, "Periodic Testing of Diesel Generators Used an Onsite Electric Power Systems at Nuclear Power Plants"; and

7. Regulatory Guide 1.6, "Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution System."

IV. EVALUATION

In the following five sections, we identify those portions of the Oconee Nuclear Station's Technical Specifications where the licensee has proposed changes, we address the details of our evaluation and the bases for our conclusion on each of the proposed changes.

1. The proposed change to the Section 3.7.1(c) of the Technical Specifications improves the definition of the two emergency power supply systems to precisely describe the components in the two emergency power paths. One path consists of the Keowee hydro unit, the underground feeder, transformer CT 4, and a 4160 volt standby bus. The other path consists of the second Keowee hydro unit, 230 kV overhead lines, breaker PCB 9, and the 230 kV switchyard yellow bus, through the respective operating unit's startup transformer or the aligned and connected alternate startup transformer. The two paths are independent and redundant, and in accordance with IEEE 308-1974, Section 5.2.4.(1) described as "the standby power supply shall consist of all components from the stored energy to the connection to the distribution system's supply circuit breaker."

   Each 4160 volt main feeder bus of each unit can receive power from the 230 kV switchyard through the unit's startup transformer, or the aligned and connected alternate startup transformer or through the unit's auxiliary transformer back-fed from the main step-up transformer. The 4160 volt main feeder bus for each unit can also receive power from the 4160 volt standby bus through the 13.8 kV underground feeder supplying transformer CT 4.

   Additionally, Specification 3.7.1.(f) has been revised to allow operation utilizing the redundancy present in the 125 Vdc Instrumentation and Control System (I&C). The 125 Vdc I&C power system consists of two batteries, three battery chargers, and two I&C distribution centers per unit. Each of the 125 Vdc I&C distribution (e.g., IDCA or IDCB) centers is normally supplied power from its associated battery charger. One I&C battery and associated charger, however, is capable of supplying two I&C control distribution centers (e.g., IDCA and IDCB) and their associated panel board loads. All reactor protection and engineered safety feature loads on this system can be powered from either the Units 1 and 2 or the Units 2 and 3 or Units 3 and 1, 125 Vdc I&C distribution centers (see FSAR Figure 8-5). Thus, a maximum of only five I&C batteries, with their respective chargers are required to be operable if all three reactors are operating.

The proposed changes to the Technical Specification 3.7.1 demonstrate this installed redundancy and satisfaction of single failure criterion in accordance with Regulatory Guide 1.6, Position D.1, "The electrically powered safety loads (a-c and d-c) should be separated into redundant load groups such that loss of any one group will not prevent the minimum safety functions." We find these changes acceptable.

2. The proposed changes to Section 3.7.2 (a) through (e) of the Technical Specifications provide the limiting conditions for operation on a complete string of power supply rather than on individual components of the ac and dc power supply systems, as is done in the current Standard Technical Specifications. The changes incorporate the definition of the onsite standby power paths in Specification 3.7.1. The licensee's proposals provide more stringent limiting condition for operation (LCO) than the LCO in the current Technical Specifications.

   Allowance has also been made for specific test operations associated with 125 Vdc systems. When the discharge test is required to be performed on each battery annually, the accompanying equalizer battery charges required 48 hours more than the 24 hours authorized for inoperability in 125 Vdc systems. The battery charger can supply all connected ESF and reactor protection steady state loads while its battery is returned to or maintained in equalizing charge. The battery discharge service test does not affect adversely the capability and availability of the 125 VDC system during the subsequent 72 hours when the battery is on equalizing charge. We find the proposed changes of Specification 3.7.2 acceptable.

3. The licensee proposed to change the descriptions of and provide the actual maximum load conditions for the bases of the dc system capacity. The actual load condition shown in the revised dc capacity bases is lighter and more practical than that stated in the current Technical Specifications. The changes provide more margin in dc capacity. We find these changes acceptable.

4. The proposed changes to Sections 4.6.9 through 4.6.12 of the Technical Specifications regarding the periodic surveillance testing for the batteries improve the surveillance in terms of test procedures. The surveillance requirements comply with the criteria of IEEE Std. 450 and Regulatory Guide 1.32. Therefore, we find the proposed changes acceptable.

5. The proposed change to Section 4.6.2 is to test the entire emergency underground power path from Keowee hydro unit to engineering safety features (ESF) loads of a shutdown within 25 seconds. Promptly following the above test, the hydro unit will be loaded to at least the combined load of the auxiliaries actuated by ESF signal in one unit and the auxiliaries of the

other two units in hot shutdown by synchronizing the hydro unit to the offsite power system and assuming the load at the maximum practical rate. The current Technical Specification 4.6.2 requires that a Keowee hydro unit carry the equivalent of the maximum safeguards load of one unit within 25 seconds of a simulated requirement for engineered safety features. Under a postulated requirement for emergency power, each Keowee hydro unit is capable of starting and providing necessary power within 25 seconds. If the test were accomplished with a unit shutdown and all of the systems associated with the unit were fully operational, there still would not be sufficient load to run the test. It is not possible to provide the required load within 25 seconds for the test without adverse impact on the operating units. (The test could not be accomplished with a unit operating without causing a reactor trip to occur.) Based on IEEE 338-1975, Standard Criteria for the Periodic Testing of Nuclear Power Generating Station Class 1E Power and Protection Systems, Section 6 (2), "the overlap tests are permitted where full functional tests are not practical," the sequential tests and overlap tests are acceptable. Furthermore, each hydro unit is started and operated daily at power levels in excess of the worst case requirements of the Oconee Station. Starting times of 17 to 19 seconds are typically experienced during these operations. In addition to these daily operations, the automatic controls of the 230 kV switchyard have been qualified as Class 1E and are tested annually for proper operation of the 230 kV switchyard breakers. Therefore, the proposed changes to Technical Specification, which require that each Keowee hydro unit be verified capable of carrying load and available to the ESF load of a shutdown unit on 4160 volt emergency buses with 25 seconds of a simulated requirement for engineered safety feaures, are acceptable.

V. CONCLUSIONS

Based on our review of:

1. The definition of power paths and the surveillance requirements of the 125 Vdc;

2. The limiting condition for operation of ac and dc power supply;

3. The maximum actual load condition for dc system capacity;

4. The periodic testing surveillance for the batteries; and

5. The test procedure of the ac emergency power supply (Keowee hydro unit),

we conclude that the proposed changes to the Technical Specifications are acceptable.

VI. REFERENCES

1. 10 CFR 50, Appendix A, General Design Criterion 17, Electrical Power System.

2. 10 CFR 50, Section 50.36 (c), (2) Limiting Conditions for Operation.

3. IEEE Std. 308-1974, IEEE Standard Criteria for Class IE Power Systems for Nuclear Power Generating Stations.

4. IEEE Std. 450-1975, IEEE Recommended Practice for Maintenance, Testing and Replacement of Large Lead Storage Batteries for Generating Stations and Substations.

5. Regulatory Guide 1.93, Availability of Electric Power Sources, dated December 1974.

6. Oconee Nuclear Station Technical Specifications, Section 3.7 and 4.6.

7. Letter from Mr. W. O. Parker, Jr. (Duke Power Co) to Mr. E. G. Case (NRC) dated February 1, 1978.

8. Letter from Mr. W. O. Parker, Jr. (DPCO) to Mr. E. G. Case (NRC) dated June 12, 1978.

9. Letter from Mr. W. O. Parker, Jr. (DPCO) to Mr. H. R. Denton (NRC) dated October 31, 1978.

10. Final Safety Analysis Report Oconee, Units 2 and 3.

RELATED CORRESPONDENCE

Docketing & Sec. "H" St

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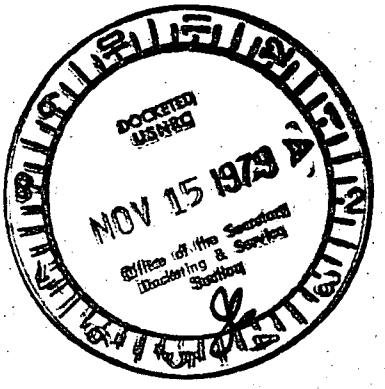
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

November 7, 1979

11/7/79



Docket Nos: 50-269, 50-270, 50-287,
50-302, 50-312, 50-313,
50-346

TO ALL BABCOCK & WILCOX (B&W) OPERATING PLANTS
(EXCEPT THREE MILE ISLAND, UNIT 1)

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION - BAW REPORT 1564, "INTEGRATED CONTROL SYSTEM RELIABILITY ANALYSIS"

By letters dated August 31, 1979, each B&W operating plant licensee indicated a general endorsement of B&W's generic report BAW-1564, "Integrated Control System Reliability Analysis."

Our joint review of this report with Oak Ridge National Laboratory has progressed sufficiently to assure ourselves that the recommendations that the report offers with regard to potential areas of improvement in ICS reliability are reasonable. Therefore, we request that you address these recommendations and discuss your followup action plans in this matter. Response to the enclosed request for additional information should be submitted within 14 days of receipt of this letter.

As part of the continuing review of this report, additional areas may be highlighted as requiring improvement. In that event, we will provide additional requests in these specific areas as necessary.

If you cannot meet this schedule or if you require any clarification of these matters please contact Mr. Robert Capra on (301) 492-7745.

Sincerely,

Morton B. Fairtile for

Robert W. Reid, Chief
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Enclosure:
As stated

cc: J. Anderson, ORNL
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See attached lists

Enclosure

REQUEST FOR ADDITIONAL INFORMATION
ON REPORT BAW-1564

For the following recommendations from report BAW-1564,

- Describe how you plan to implement the recommendation; and
- The schedule for the implementation; or
- Basis for not implementing the recommendation at your plant.

1. ICS-Related

   a. NNI/ICS power supply reliability

      NOTE: This area is of particular importance because it is listed as the source of most of the ICS input failures. The staff is not only concerned with the "reliability" of the power supplies, but also the design philosophy of the power supply implementation. It appears that power supply failures can lead to multiple problems such as the Rancho Seco event of March, 1978.

   b. Reliability of input signal from the NI/RPS system to the ICS - specifically, the RC flow signal.

   c. ICS/BOP system tuning, particularly feedwater condensate systems and the ICS controls.

      NOTE: Although this concern is related to tuning, it appears that more basic design and/or operational problems in the feedwater (and related) system may exist.

      Therefore, include a discussion of the following items:

      (1) Any particular operational (startup, etc.) problems experienced at your plant with respect to the ICS. Reference to previously submitted information is acceptable.

(2) Bases for operator intervention in place of automatic ICS action (including start-up, power operation and shutdown activities).

(3) Procedures used by the operator to perform the operation described in 1c(2) above.

(4) Additional training provided to the operator.

2. Balance of Plant

a. Main feedwater pump turbine drive minimum speed control - to prevent loss of main feedwater or indication of main feedwater.

b. A means to prevent or mitigate the consequences of a stuck-open main feedwater startup valve.

c. A means to prevent or mitigate the consequences of a stuck-open turbine bypass valve.

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