



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA STREET, N.W., SUITE 2900
 ATLANTA, GEORGIA 30323-0199

Report Nos.: 50-269/93-29, 50-270/93-29 and 50-287/93-29

Licensee: Duke Power Company
 422 South Church Street
 Charlotte, NC 28242-0001

Docket Nos.: 50-269, 50-270, 50-287, 72-4

License Nos.: DPR-38, DPR-47, DPR-55, SNM-2503

Facility Name: Oconee Nuclear Station

Inspection Conducted: October 19 - 27, 1993

Inspector: *P. Harmon* *FR* 10/29/93
 P. Harmon, Senior Resident Inspector Date Signed

W. Poertner *FR* 10/29/93
 W. Poertner, Resident Inspector Date Signed

Approved by: *M. Lesser* 10/29/93
 M. Lesser, Section Chief Date Signed
 Projects Section 3A
 Division of Reactor Projects

SUMMARY

Scope: This special inspection was conducted to review the events associated with a component failure which caused inoperability of one of the emergency power sources which was initially discovered in September, 1992.

Results: One apparent violation was identified involving a lack of prompt corrective action to resolve a previously identified deficiency. A component essential to the operation of the emergency power distribution system was found to have never been adequately tested. Corrective action was not timely and when testing ultimately was performed, it was discovered to have been inoperable for an indeterminate period.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *H. Barron, Station Manager
- S. Benesole, Safety Review Manager
- D. Coyle, Systems Engineering Manager
- J. Davis, Safety Assurance Manager
- T. Coutu, Operations Support Manager
- B. Dolan, Manager, Mechanical/Nuclear Engineering
- W. Foster, Superintendent, Mechanical Maintenance
- *J. Hampton, Vice President, Oconee Site
- D. Hubbard, Component Engineering Manager
- C. Little, Superintendent, Instrument and Electrical (I&E)
- *M. Patrick, Regulatory Compliance Manager
- B. Peele, Engineering Manager
- *S. Perry, Regulatory Compliance
- *G. Rothenberger, Operations Superintendent
- R. Sweigart, Work Control Superintendent

Other licensee employees contacted included technicians, operators, mechanics, and staff engineers.

NRC Resident Inspectors

- *P. Harmon
- *W. Poertner

*Attended Exit Interview

2. Background

During accident conditions concurrent with the loss of offsite power, the emergency power supply for Oconee Nuclear Station is the two Keowee Hydrostation units. The two hydroelectric generators provide the emergency power through two separate and independent paths. One path, the overhead path, is a 230 kv transmission line to the Oconee station 230 kv switchyard yellow bus, which will supply each unit's startup transformer. The other path is an underground feeder to the Oconee CT-4 transformer. The Keowee units are normally lined up with one unit aligned to the overhead path, and the other aligned to the underground path. No particular precedence is established for which Keowee unit is aligned to which path.

Automatic start of both Keowee units occurs on a loss of the grid, an engineered safety features actuation, or loss of voltage on an Oconee unit's main feeder bus. On loss of offsite power, the Keowee unit assigned to the overhead path will connect to the yellow bus after the yellow bus has been disconnected from the grid. When Keowee unit 2 is aligned to the overhead path, this connection is via ACB-2. Confirmation that the yellow bus has been disconnected from the grid,

and is ready for connection to Keowee unit 2 is accomplished by relay 27T2X, a Westinghouse MG-6 relay. If this relay does not operate, the ACB will not close in and the Keowee unit will not provide power to the yellow bus.

3. Event Description

On September 29, 1992, at approximately 10:00 p.m., technicians were in the process of performing post-modification tests on ACB-2. When ACB-2 did not close as required, the licensee investigated and discovered that an MG-6 relay, 27T2X, was set with an improper gap of one half inch instead of seven sixteenths as required by the manufacturer. Technicians found a plastic armature stop nut was broken. The relay was repaired and the post-modification test was performed successfully.

The licensee performed a root cause investigation and determined that the ACB-2 failure was caused by the failed MG-6 relay. The exact time of the failure is indeterminate, and could have existed since original installation. The MG-6 relay had not been modified, inspected or tested since original installation.

The licensee submitted Licensee Event Report LER 269/92-14 on October 29, 1992 to document the event. The LER concluded that Keowee Unit 2 had been inoperable for an indeterminate period of time prior to discovery during the periods when Keowee unit 2 was aligned to the overhead path. When called upon in that configuration, Keowee Unit 2 would not have been available to supply emergency power to the Ocone units.

As previously stated, the MG-6 relay and consequently the Keowee overhead path were inoperable for an indeterminate period of time. The time is indeterminate for the following two reasons:

- A. The overhead path through ACB-2 was inoperable only when Keowee Unit 2 was aligned to the overhead path. Swapping of Keowee Units between overhead and underground paths is done routinely.
- B. Neither the specific MG-6 relay nor the Keowee overhead path had ever been tested according to the licensee. The relay and consequently the overhead path could have been inoperable since initial installation. Periodic testing of either the relay or the overhead path would have identified the problem.

The inspectors had discussed the issue regarding the lack of direct testing of the overhead path with the licensee prior to this event. The licensee had acknowledged the inspectors' concern, and stated that they were in the process of devising a test to prove that the overhead path would work if called upon. The licensee's test, as required by T.S. 4.6.5, was limited to testing the External Grid Protection System Logic. This test is a logic continuity test and does not directly test the Keowee overhead function.

Oconee T.S. 4.6.2.a requires that the Keowee Hydro units will be started annually using the emergency start circuits in each control room. This is to verify that each hydro unit and associated equipment is available to carry load within 25 seconds of a simulated requirement for engineered safety features. The licensee conforms to this requirement by performing PT/O/A/0620/16, Keowee Hydro Emergency Start Test. This performance test verifies operability of the Keowee emergency start circuitry, and demonstrates that both Keowee units can supply 25 MW of power within 25 seconds of emergency start initiation. The test does not verify operability of the MG-6 feature of ACB-2. The inspectors questioned whether MG-6 is included as "associated equipment" referred to in T.S. 4.6.2.a. The licensee stated that they do not consider this to be the intent of the T.S. In effect, the licensee had never tested the actual path emergency power would have to take from Keowee to the Oconee emergency buses via the overhead line. The inspectors documented their concerns in NRC Inspection Report 50-269, 270, 287/92-24 as Unresolved Item 92-24-01.

The inspectors determined that in January, 1991, the licensee completed a Design Baseline Determination (DBD) on the Keowee Emergency Power System. The published results included a Test Acceptance Criteria (TAC) which listed the specific test requirements necessary to provide assurance of operability of the system. The TAC includes specific requirements to test the overhead path, and to test the ACB-1 and ACB-2 breaker functions. The licensee performed some preliminary work on devising tests to satisfy the TAC requirements, but had not fully developed the tests when the failure was discovered on September 29, 1992.

The Code of Federal Regulations, 10 CFR 50, Appendix B, Criterion XI requires that a program be established to assure that all testing required to demonstrate that structures, systems and components will perform satisfactorily in service is identified and performed.

The Code of Federal Regulations, 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, requires that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. In the instance described above, the licensee had identified deficiencies in the test program relative to full functional testing of the emergency power path. However, corrective actions were not pursued in a timely manner to devise and perform the required tests. Specifically the test inadequacy was discovered in January 1991 and corrective action was not implemented until September 1992, some 20 months later. Prompt corrective action to devise and perform the required tests would have identified that the overhead emergency power path was inoperable prior to the discovery date. This apparent violation is being considered for escalated enforcement action, 50-269, 270, 287/93-27-01: Untimely Corrective Action for Test Program Inadequacy Causes Keowee Unit 2 Inoperability for Indeterminate Time.

4. Exit Interview

The inspection scope and findings were summarized on October 27, 1993, with those persons indicated in Paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection finding. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspectors during this inspection nor did they provide any dissenting comments.

<u>Item Number</u>	<u>Description/Reference Paragraph</u>
50-269,270,287/93-29-01	(Apparent Violation) Untimely Corrective Action for Test Program Inadequacy Causes Keowee Unit 2 Inoperability for Indeterminate Time (paragraph 3).