



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

Report No.: 50-261/93-22

Licensee: Carolina Power and Light Company
 P. O. Box 1551
 Raleigh, NC 27602

Docket No.: 50-261

License No.: DPR-23

Facility Name: H. B. Robinson

Inspection Conducted: September 27 - October 1, 1993

Inspector: S. Pichard for
 N. Salgado

10/26/93
 Date Signed

Approved by: M. Shymlock
 M. Shymlock, Chief
 Plant Systems Section
 Engineering Branch
 Division of Reactor Safety

10-26-93
 Date Signed

SUMMARY

Scope:

This routine, announced inspection was conducted in the area of electrical maintenance to assess the implementation of the switchyard circuit breaker replacements. The inspector reviewed the modification to the switchyard and implementation planning for the main generator circuit breakers which will be replaced during refueling outage 15. Additionally, the inspector reviewed the licensee's actions on previously identified NRC inspection findings.

Results:

The switchyard circuit breaker replacement activities were appropriately controlled. The licensee adequately evaluated potential plant vulnerabilities inherent in switchyard maintenance activities. The licensee implemented appropriate precautions to assure required redundant power sources were maintained. The plant modification documentation provided adequate controls for the main generator circuit breakers replacement. The following open items were closed: VIO 92-25-01, IFI 92-25-02, and IFI 92-25-03. In the areas inspected, violations or deviations were not identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- G. Attarian, Chief, Electrical Systems
- *R. Barnett, Project Management Manager
- *T. Cleary, Technical Support Manager
- *D. Crook, Senior Specialist Regulatory Affairs
- C. Dietz, Vice President, RNP
- J. Jenkins, Systems Planning
- A. McCauley, Jr., Manager of Electrical Systems
- T. McNamara, Senior Engineer, Technical Support, Electrical
- R. Moore, Shift Supervisor
- D. Nelson, Shift Outage Manager
- *J. Prim, Senior Staff Engineer Transmission Maintenance
- *R. Steele, Maintenance Programs Manager
- *D. Stoddard, Project Engineer
- D. Tolman, Systems Engineer
- J. Townsend, Senior Engineer
- R. Wallace, Operations Manager
- J. Wiggins, Operations Technician
- *K. Williams, Project Engineer
- D. Windsor, Senior Engineer

Other licensee employees contacted during this inspection included craftsmen, engineers, operators, and technicians.

NRC Employees

- *B. Crowley, Regional Inspector
- *C. Ogle, Resident Inspector
- *W. Orders, Senior Resident Inspector

*Attended Exit Interview

Acronyms and abbreviations are listed in paragraph 7.

2. Electrical Maintenance (62705)

Scope of the Switchyard Circuit Breaker Replacement Modification

To improve grid system stability the licensee's Transmission Department (TD) was replacing all twelve 230 kV oil circuit breakers (OCBs) in the Robinson 230 kV switchyard. Ten of the 230 kV circuit breakers were utilized for control and protection of the transmission system. Two of the circuit breakers were used for control of the output from the Robinson Nuclear Plant (RNP) main generator. The OCBs are being replaced with two cycle, independent pole, gas circuit breakers (GCBs). An analyses by the licensee's system planning personnel demonstrated a need to reduce the circuit breaker clearing times to improve system stability. The new circuit breakers have a two cycle clearing time

versus a three cycle clearing time for the OCBs. The switchyard circuit breaker replacement modification activity was reviewed in NRC inspection report number 50-261/93-17.

3. Completed Switchyard Circuit Breaker Replacements

Between April 5 - September 20, 1993, ten OCBs were replaced with GCBs by TD personnel. The licensee was ahead of schedule partly due to the early replacement of circuit breaker 52/7 (refer to Figure 1). A revision to the outage schedule was initiated to provide a window of time for the replacement of 230 kV breaker 52/7. The change was initiated when an analysis of the transmission system by the System Operation Planning Group determined that the replacement of the breaker should occur when Unit 2 output was less than 500 MWe. There was a risk associated with damaging the main generator in the event of a 230 kV North Bus lockout with Unit 2 at any power level greater than 500 MWe. The breaker was replaced during the early part of the RFO15, September 11 - 20, 1993, and was returned to service prior to core offload and the "B" EDG maintenance. The actions taken by the licensee to replace 52/7 were appropriate and adequate.

During the circuit breaker replacements coordination between the Project Coordinator and Operations personnel prevented critical work from being conducted in the switchyard during the periods when one of the Emergency Diesel Generators (EDG) "A" or "B" were inoperable. Examples of critical work as defined by Operations were 100 ton crane lifts, concrete trucks, switching to place OCB's in or out of service, etc. The inspector verified that TD was aware of the times when an EDG was inoperable by cross verifying TD logs, the plant's Safety System Equipment Inoperable Report for the EDG, and discussions with TD and Operations personnel. Also, to enhance communications, the Project Coordinator was required to attend the morning pre-shift briefing in the control room each day that work was ongoing in the switchyard. Communications between Operations and the TD during switchyard evolutions were good and assured understanding of activities in the switchyard.

As part of the risk management the licensee reviewed past switchyard related events that have occurred at nuclear stations. The inspector reviewed the licensee matrix of switchyard events which addressed the issues to prevent event repetition by incorporating necessary precautions such as the use of backing guides during heavy equipment movement in the switchyard, minimizing the use of cranes, and preventing critical work in the switchyard when one EDG was inoperable. The Project Coordinator was the focal point for the project. He was charged with controlling personnel and vehicle access to the switchyard, coordinating switchyard/plant activities, performing risk assessment and potential problem analysis, and modifying the work plan as needed. The licensee adequately addressed plant vulnerabilities associated with the activities conducted in the switchyard.

4. Planned/Scheduled Generator Circuit Breaker Replacement

The two generator breakers will be replaced simultaneously during RF015 (approximately October 10 - 25, 1993). The two main generator breakers, 52/8 and 52/9 are controlled from the Robinson Unit 2 Control Room and auxiliary contacts from the breakers are involved with other equipment in the plant.

The inspector reviewed plant modification, M-1133, Replace 230 kV Generator Breakers and verified that provisions had been included for controlling the various aspects of the implementation activity. Per M-1133, replacement of the generator circuit breakers will be done by TD under their design and construction procedures. Changes in control circuits associated with the two generator breakers will also be conducted by TD. The RNP Modification Implementation (MI) personnel will be responsible for reviewing all prerequisites, precautions, and general requirements in M-1133. They will also be responsible for installing new cables and rerouting cables in the plant. RNP Operations will be responsible for clearances, tagging and operating equipment, and releasing systems to TD and MI. Testing of the new circuit breakers will be performed jointly by TD personnel and Plant Operators. The testing will include: testing the control circuits for the generator circuit breakers; testing the protective relays connected to the circuit breaker's current transformers; testing the plant annunciator alarms from the generator circuit breakers; and testing the interlocks between the generator circuit breakers and other equipment in the plant. The modification package contained appropriate precautions, and clearly delineated responsibilities for licensee personnel. The inspector also reviewed the licensee's M-1133, 10 CFR Part 50.59 safety review. No problems were identified. The plant modification implementation package was adequate to perform the generator circuit breaker replacement.

The inspector reviewed the Shutdown Management Assessment Report for RNP-R015 Refueling Outage Schedule to assess provisions for maintaining required power sources during the implementation of plant modification, M-1133. The replacement of the unit output breakers 52/8 and 52/9 were scheduled to occur after all work was completed on the EDGs, the Dedicated Shutdown Diesel, and Startup Transformer (SUT). This ensured the availability of four sources of AC power during the scheduled work in the switchyard. The licensee appropriately addressed the vulnerabilities associated with losing AC power during the switchyard modification.

Additional assurance of maintaining required power sources was accomplished by use of the Project Coordinator. During the unit circuit breakers simultaneous replacement, the capability to backfeed through the main transformer will be unavailable for approximately fifteen days. The Project Coordinator will have the same duties as previously discussed with the added precaution that he will prevent work being conducted in the 115 kV switchyard during the generator circuit breakers replacements. The 115 kV switchyard provides power to the SUT which will be the only source of offsite power during the generator circuit

breaker replacement. The inspector concluded that the shutdown assessment and the assignment of the Project Coordinator adequately assured that AC power would be maintained during the implementation of the modification.

5. Follow-up on Previous Inspection Findings (92701)

5.1 (Closed) Violation 92-25-01: Inadequate Procedural Guidance For Operation of 4kV Breaker 52/12.

The licensee responded to Violation 92-25-01, and acknowledged that it occurred as described in the Notice. As part of their corrective action, Adverse Condition Report (ACR) 92-340 was initiated to determine the root cause and corrective actions. The inspector reviewed ACR 92-340 and its associated corrective action. As part of the licensee's corrective action procedure OP-603, Electrical Distribution, Revision 32 was revised to include instructions for clearing the SUT for maintenance following the loss of all AC caused by a malfunction of the SUT. The instructions included control and sequencing of component operation, and system alignment in preparation for placing the SUT back in service. Another part of the corrective action consisted of placing instruction labels on 4 kV breakers containing breakers rack-in methodology. The inspector physically verified that the labels had been placed on the breakers during a walkdown inspection. The final part of the corrective action, writing a preventive maintenance (PM) procedure for inspecting and cleaning the 4 kV switchgear, was scheduled to for completion on December 17, 1994. The new PM procedure will be more comprehensive than the existing checklist used for this task, and will include testing the breakers. Based on the licensee's scheduled and completed corrective action, this item was closed.

5.2 (Closed) IFI 92-25-02: Weak Work Control And Modification Control In The Switchyard.

The original concerns were about the adequacy of the interface agreement, Customer/Supplier Agreement Between Florence Transmission Maintenance And Robinson Nuclear Project Department. The licensee indicated they would perform a review of the Agreement to determine if additional controls were needed. On August 31, 1993, the licensee completed its review of the interface Agreement. The review determined that a revision to the interface Agreement was necessary to include an acceptable definition of what is a "modification." Also, additional guidance was needed to clearly indicate the level of review required before modifying various circuits/components/systems which interface with the TD. The actual revision of the Transmission/RNP Customer/Supplier Agreement will be initiated after the Loss of Offsite Power (LOOP) team develops a common definition of what is a "modification" as well as specific boundaries which will define the level of review when a modification is required. Based on the licensee's scheduled corrective action, this item was closed.

5.3 (Closed) IFI 92-25-03: Startup Transformer Reliability Improvements

The licensee indicated that they would perform an engineering evaluation of weatherproofing for specific equipment types including the main, auxiliary, and startup transformers. The licensee performed an evaluation of weatherproofing the main, auxiliary, and startup transformers. After discussions with Florence Transmission Maintenance the licensee decided that no additional actions were required to weatherproof the main, auxiliary, and startup transformers. The evaluation also included other equipment in the plant such as bus ducts, exposed insulators, current and potential transformers, junction boxes, control cabinets, cables, connectors, and exposed indicators, and gages. As part of the evaluation the licensee conducted walkdown inspections of plant equipment. During these walkdown inspections a silicone rubber sealant was applied to equipment if the existing weatherproofing could be enhanced. This item is closed.

6. Exit Meeting

The inspection scope and results were summarized on October 1, 1993, with those persons indicated in paragraph 1. The inspectors described those areas inspected and discussed in detail the inspection results listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

- (Closed) Violation 92-25-01: Inadequate Procedural Guidance for Operation of 4 kV Breaker 52/12
- (Closed) Inspector Followup Item 92-25-02: Weak Work Control and Modifications Control in the Switchyard
- (Closed) Inspector Followup Item 92-25-03: Startup Transformer Reliability Improvements

7. Acronyms and Abbreviations

AC	Alternating Current
ACR	Adverse Condition Report
CFR	Code Of Federal Regulations
CP&L	Carolina Power And Light Company
EDG	Emergency Diesel Generator
GCB	Gas Circuit Breaker
IFI	Inspector Follow-up Item
kV	Kilo-Volts
LOOP	Loss Of Offsite Power
MI	Modification Implementation

MWe	Mega-Watts-Electric
OCB	Oil Circuit Breaker
PM	Preventive Maintenance
RNP	Robinson Nuclear Plant
RFO	Refueling Outage
SUT	Startup Transformer
TD	Transmission Department
VIO	Violation

FIGURE 1

