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

Report No.: 50-261/93-23

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: October 18 - 22, 1993

Inspector: N. Salgado 11/17/93
N. Salgado Date Signed

Approved by: M. B. Shymlock 11-17-93
M. B. Shymlock, Chief Date Signed
Plant System Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, announced inspection was conducted in the area of electrical maintenance to assess the licensee's corrective actions on previously identified Violation 93-07-01, Failure To Establish Adequate Emergency Diesel Generator Surveillance Test Procedures As Required By TS 4.6.1.1. The inspector also reviewed the post maintenance operability testing of the new main generator circuit breakers. Additionally, the inspector reviewed the status of implementation of station blackout guidelines.

Results:

As part of the licensee's corrective action to Violation 93-07-01, a twenty-four hour load test was conducted on the "A" Emergency Diesel Generator (EDG). With minor exceptions, the test was adequately performed. The "B" EDG twenty-four hour load test will be conducted prior to the end of the current refueling outage. After both EDGs are successfully tested the licensee intends on submitting an amendment to TS to incorporate a power factor range (i.e., 0.8 to 0.9) for the EDG twenty-four hour run test that will be performed every refueling outage. Violation 93-07-01 will remain open since the licensee's corrective actions were not complete. The post maintenance operability testing of plant modification, M-1133, Replace 230 kV Generator Breakers was adequate. The licensee had filed an extension with NRR for compliance with 10 CFR Part 50.63 until the end of the current refueling outage. 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
*D. Baur, Regulatory Affairs
*R. Beverage, Quality Control Supervisor
*T. Cleary, Technical Support Manager
D. Crook, Senior Specialist Regulatory Affairs
*J. Curley, Robinson Engineering Support Manager
*C. Dietz, Vice President, Robinson Nuclear Project Department
S. Hardy, Senior Specialist/Safe Shutdown
B. Hynds, Project Engineer
G. Kirven, System Engineer
*A. McCauley, Jr., Manager, Electrical Systems
D. Nelson, Shift Outage Manager
*C. Olexik, Robinson Assessment Section Manager
*M. Pearson, Plant Manager
*J. Prim, Senior Staff Engineer Transmission Maintenance
D. Tolman, Systems Engineer
J. Townsend, Senior Engineer
*D. Waters, Regulatory Affairs Manager
L. Wiegand, Senior Reactor Operator
D. Windsor, Senior Engineer

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

NRC Employees

*R. Carrion, Radiation Specialist
*R. Chou, Regional Inspector
*C. Ogle, Resident Inspector
*P. Stohr, Director, Division of Radiation Safety and Safeguards

*Attended Exit Interview

Acronyms and abbreviations are listed in paragraph 6.

2. Follow-up on Previous Inspection Findings (92702)

2.1 (Open) Violation 93-07-01, Failure To Establish Adequate Emergency Diesel Generator Surveillance Test Procedures As Required By TS 4.6.1.1.

The licensee responded to Violation 93-07-01 on June 5, 1993. Carolina Power and Light (CP&L) did not contest the subject violation. The licensee attributed the violation to a historical interpretation of Technical Specification (TS) 4.6.1.1 which resulted in a surveillance test acceptance criteria that utilized only the EDG continuous load

rating of 2500 kW instead of the complete nameplate rating. In response to the violation the licensee stated they would perform testing which would demonstrate the EDG's ability to carry accident kW and kVA loadings prior to the end of the current refueling outage (RFO) 15.

While preparing the necessary EDG test procedures the licensee realized that the analyzed accident load would exceed the EDG continuous load rating of 2500 kW as specified in TS 4.6.1.4. On August 5, 1993, the licensee submitted an amendment to NRR addressing TS 4.6.1.1 and 4.6.1.4. TS 4.6.1.1, now states that on a monthly basis, each diesel generator shall be tested by manually-initiated start, followed by manual synchronization with other power sources, and verification that each diesel generator is loaded and operates for $\geq$ to 60 minutes at a load $\geq$ 2350 kW and $\leq$ to 2500 kW. In TS 4.6.1.4, the change included limitations for the continuous load rating and the short-term overload rating of 2750 kW which was adequate to demonstrate the EDG capability to carry the analyzed accident load. The amendment's Safety Evaluation recognized that the licensee had committed to amend the TS in the near future after procedures had been finalized. The planned TS change will include a power factor range (i.e., 0.8 to 0.9) for the EDG 24-hour run test that will be performed every RFO.

2.2 EDG "A" Twenty-four Hour Load Test

The inspector reviewed operations surveillance test procedure OST-410, Emergency Diesel Generator "A" (Twenty-four Hour Load Test) (Refueling), Revision 0 and the associated 10 CFR Part 50.59 safety evaluation for completeness and adequacy. The purpose of OST-410 was to satisfy TS 4.6.1 by performing a twenty-four hour load test run of EDG "A." EDG "A" would be tested for twenty-two hours at 2400-2500 kW and the lowest achievable power factor (i.e., lowest power factor without exceeding either the 3125 kVA continuous EDG rating or 506 VAC at the associated emergency bus). EDG "A" would also be tested for two hours at 2675-2750 kW and the lowest achievable power factor (i.e., lowest power factor without exceeding either the 3438 kVA two hour EDG overload rating or 510 VAC at the associated emergency bus). The safety evaluation documented that the previously mentioned ranges stem from EE107-CS-63, Engineering Evaluation of Emergency Diesel Generator Load Test Per Operation Surveillance Test Procedures OST-410 and OST-411, Revision 0. The engineering evaluation referenced the calculated accident analysis maximum loading of 2680 KW at 0.87 power factor. The 2750 kW load run envelopes the analyzed accident load. Also, as documented in the safety evaluation, the 2500 kW twenty-two hour load run ranges bound the continuous loading expected on the EDG during a design basis accident.

To perform the test without exceeding the 506 V E1 safety bus voltage limit, the tap settings on 4160/480 VAC Station Service Transformer 2F were required to be changed to reduce nominal E1 bus voltage by five percent before loading the EDG. Also, to maintain the 506 V E1 bus voltage limit, the test required that the 115 kV switchyard voltage be maintained as close to 115 kV as possible in order to minimize the voltage rise on the E1 bus. E1 bus voltage limit was 506 VAC during the

performance of the twenty-two hour rating test, and 510 VAC during the two hour rating test. The 510 VAC limit exceeds the operational limit of 506 VAC. The licensee determined that should the 510 VAC overvoltage condition occur during the test it would have a negligible impact on equipment life due to it's short duration and magnitude. The potential for this overvoltage was also addressed in EE107-CS-63 and was found to be acceptable. The inspector determined that OST-410 and the safety evaluation were adequate to provide requirements, limits, and guidance for operations personnel to perform the test.

On October 21, 1993, prior to commencing OST-410, the inspector attended the pre-briefing held in the control room to listen to discussions concerning OST-410 since it was a new procedure. There was good information exchanged among operations staff concerning problems that might occur during the performance of OST-410. The inspector observed the performance of OST-410 by operations personnel. As part of OST-410, maintenance work order (MWO) 93-AKSX1 was initiated to adjust the tap settings on the Station Service Transformer 2F. The inspector observed Instrument and Control personnel conduct the work specified in 93-AKSX1. Quality Control personnel independently verified the as-found tap settings as well as the final settings after the test.

During the performance of the test some exhaust cylinder temperatures exceeded their limit of 1100 degrees Fahrenheit. The system engineer for the EDGs stated that this problem had occurred before with "A" EDG, but that the temperatures were within the manufacturer's specifications. This condition was already documented and being investigated per Adverse Condition Report (ACR) 91-119. When OST-410 was being reviewed prior to it's final signature, it was identified that during the twenty-two hour load run the limit of 2500 KW had been exceeded for an approximate ten minute period. Technical Support personnel was recording generator parameters every ten minute per OST-410. At approximately 11:05 pm, 2510 kW was observed on the "A" Emergency Generator Control Panel's kW meter and recorded on the procedure's data sheet. The operator then returned the EDG kW to within the 2400 - 2500 kW band as required by OST-410. Technical Support personnel performed an evaluation on the condition which stated in part that the minimal heating associated with operating 10 kW above 2500 kW for ten minutes was insignificant from an engineering viewpoint (overheating of the diesel engine) when considering the EDG's design. There was an administrative problem associated with the completion of OST-410 concerning the 2510 kW data point. During the final OST-410 review, a contractor working for Technical Support changed the 2510 kW data point to 2500 kW on the data sheet of the procedure. Technical Support management documented in the procedure that the data point should be left as 2510 kW. Technical Support personnel proceeded to conduct the previously mentioned engineering evaluation. This administrative issue will be addressed in NRC inspection report 50-261/93-28 which will be the Resident Inspector's report. With the exception of the previously discussed issues, the EDG twenty-four hour load test was adequately performed. The EDG "B" twenty-four hour load test will be conducted prior to end of RF015. After both EDGs are

successfully tested the licensee intends on submitting an amendment to TS to incorporate a power factor range (i.e., 0.8 to 0.9) for the EDG twenty-four hour run test that will be performed every RFO. This item will remain open.

3. Electrical Maintenance (62702)

3.1 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 numbers 50-261/93-17 and 50-361/93-22.

3.2 Completed Switchyard Circuit Breaker Replacements

Between April 5 - September 20, 1993, ten OCBs had been replaced with GCBs by TD personnel (refer to Figure 1). On October 22, 1993, the plant modification to replace the generator circuit breakers, 52-8 and 52-9 was complete. The two generator breakers were replaced simultaneously during RF015 (October 12-22, 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 post maintenance operability testing had been performed by the licensee. Testing of the new circuit breakers was performed jointly by TD personnel and Plant Operators. The testing included: 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 inspector observed various portions of the above mentioned tests and the associated field revisions to the modification. The modification was complete except for the Functional Acceptance Testing of Unit 2 Main Transformer/Auxiliary Transformer/Generator Differential relaying circuit which will be conducted by TD when RNP achieves approximately thirty percent power. No problems were identified. The plant modification package contained adequate post maintenance operability testing of the new generator circuit breakers.

During the replacement of the generator circuit breakers there were four sources of AC power (EDG A, EDG B, the Dedicated Shutdown Diesel, and Startup Transformer) available at all times. Additional assurance of maintaining required power sources was accomplished by use of the Project Coordinator. The Project Coordinator had the same duties previously discussed in NRC Inspection Reports 50-261/93-17 and 50-261/93-22 with the added precaution that he prevented work from being conducted in the 115 kV switchyard during the generator circuit breakers replacements. The 115 kV switchyard provided power to the Startup Transformer which was the only source of offsite power during the generator circuit breaker replacement. The inspector determined that Adequate AC power was maintained during the implementation of the modification.

4. Status of Station Blackout Modification Implementation

On September 19, 1991, CP&L received the NRC Supplemental Safety Evaluation (SSE) of the response to Station Blackout (SBO) Rule for RNP. CP&L was to complete all new items in the SSE necessary to meet 10 CFR Part 50.63 by September 19, 1993. In a correspondence dated September 15, 1993, CP&L requested NRR for an extension for compliance with 10 CFR Part 50.63 until the end of RF015. The item requiring more time was one of the procedural enhancements identified for compliance which deals with specific instructions for manual connection of a backup nitrogen supply to the steam generator power operated relief valves (PORV). During RF015 plant modification, M-1081, Unit 2 Steam Generator PORV Control will be implemented which will provide a permanent connection for the backup nitrogen supply. NRR provided the necessary extension.

5. Exit Meeting

The inspection scope and results were summarized on October 22, 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.

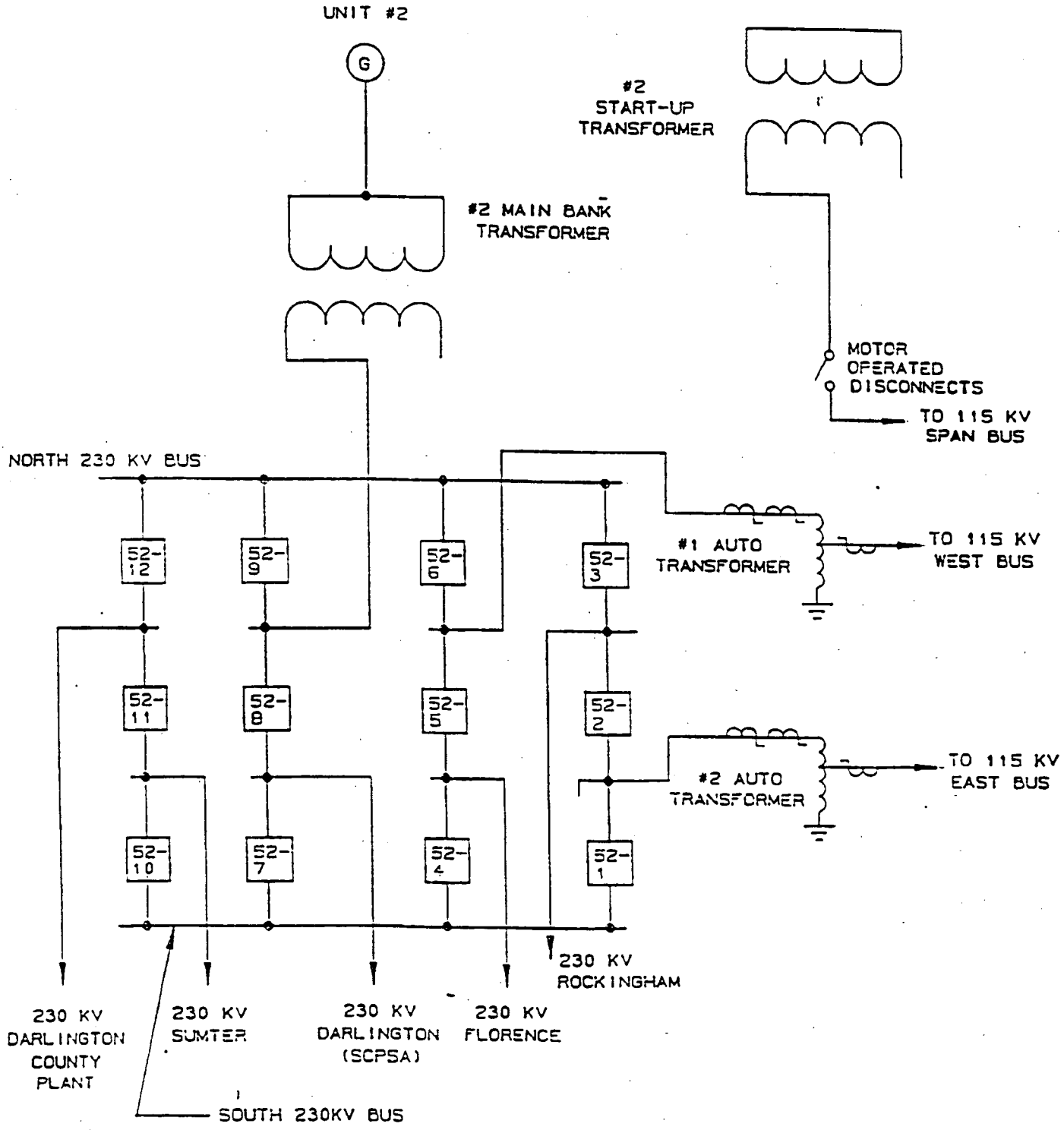
(Open) Violation 93-07-01 Failure To Establish Adequate Emergency Diesel Generator Surveillance Test Procedures As Required By TS 4.6.1.1. (paragraph 2)

6. 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
kV	Kilo-Volts
kVA	Kilo-Volt Amperes
kW	Kilowatts

MWe	Mega-Watts-Electric
MWO	Maintenance Work Order
NRR	Nuclear Regulatory Regulation
OCB	Oil Circuit Breaker
PORV	Power Operated Relief Valve
RNP	Robinson Nuclear Plant
RFO	Refueling Outage
TD	Transmission Department
TS	Technical Specification
SBO	Station Blackout
SSE	Supplemental Safety Evaluation
VAC	Volts Alternating Current

FIGURE 1


UNIT #2
G
#2 START-UP TRANSFORMER
#2 MAIN BANK TRANSFORMER
MOTOR OPERATED DISCONNECTS
TO 115 KV SPAN BUS
NORTH 230 KV BUS
52-12
52-9
52-6
52-3
#1 AUTO TRANSFORMER
TO 115 KV WEST BUS
52-11
52-8
52-5
52-2
#2 AUTO TRANSFORMER
TO 115 KV EAST BUS
52-10
52-7
52-4
52-1
230 KV ROCKINGHAM
230 KV DARLINGTON COUNTY PLANT
230 KV SUMTER
230 KV DARLINGTON (SCPSA)
230 KV FLORENCE
SOUTH 230KV BUS