



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

Report No.: 50-400/89-13

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

Docket No.: 50-400

License No.: NPF-63

Facility Name: Harris 1

Inspection Conducted: May 24 - June 20, 1989

Inspectors:	<i>W. H. Bradford</i> W. H. Bradford	<i>7/6/89</i> Date Signed
	<i>M. C. Shannon</i> M. C. Shannon	<i>7/6/89</i> Date Signed
Approved by:	<i>H. C. Dance</i> H. C. Dance, Section Chief Division of Reactor Projects	<i>7/6/89</i> Date Signed

SUMMARY

Scope:

This routine, safety inspection was conducted in the areas of operational safety verification, surveillance observations, maintenance observations, TI 2500/20 ATWS rule inspection, and IE Bulletin 89-01.

Results:

Two Inspector Followup Items are discussed in paragraphs 4.a and 4.b. The first details the failure of Brown Boveri LK16 breakers to open on demand. The second details molded case circuit breaker instantaneous trip testing and test equipment requirements. Within the areas inspected, no violations or deviations were identified.

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

- W. Batts, Supervisor, Mechanical Maintenance
- D. Braund, Supervisor, Security
- J. Collins, Manager, Operations
- G. Forehand, Director, OA/QC
- C. Gibson, Director, Programs and Procedures
- *C. Hinnant, Plant General Manager
- L. Lentz, Operations Support Supervisor
- T. Morton, Manager, Maintenance
- C. Olexik, Supervisor, Shift Operations
- R. Richey, Manager, Haris Nuclear Project Department
- J. Sipp, Manager, Environmental and Radiation Monitoring
- H. Smith, Supervisor, Radwaste Operation
- *D. Tibbits, Director, Regulatory Compliance
- B. Van Metre, Manager, Technical Support
- E. Willett, Manager, Outages and Modifications

S. Donnell, Senior Industrial Product Specialist
Seimens Energy and Automation, Inc.

Other licensee employees contacted during this inspection included engineers, operators, mechanics, security force members, technicians, and administrative personnel.

*Attended exit interview

Acronyms and initialisms used in the report are listed in paragraph 8.

2. Operational Safety Verification (71707)

The inspectors observed control room operations, reviewed applicable logs, and conducted discussions with control room operators during the report period. The operability of selected emergency systems were verified, tagout records were reviewed, and proper return to service of affected components was verified. The inspector conducted routine plant tours during this inspection period to verify that the licensee's requirements and commitments with selected LCOs and results of selected surveillance tests were met. The verifications were accomplished by direct observation of monitoring instrumentation, valve positions, switch positions, accessible hydraulic snubbers, and review of completed logs, records, and chemistry results. The licensee's compliance with LCO action statements were reviewed as events occurred.

The inspectors routinely attended meetings with certain licensee management and observed various shift turnovers between shift foremen and licensed operators. These meetings and discussions provided a daily status of plant operations, maintenance, and testing activities in progress, as well as discussions of significant problems.

Site security was evaluated by observing personnel in the protected and vital areas to ensure that these persons had the proper authorization. The inspectors verified that vital area portals were kept locked and alarmed. The security personnel appeared to be alert and attentive to their duties and those officers performing personnel and vehicular searches were thorough and systematic. Responses to security alarm conditions appeared to be prompt and adequate.

Selected activities of the licensee's Radiological Protection Program were reviewed by the inspectors to verify conformance with plant procedures and NRC regulatory requirements. The areas reviewed included operation and management of the plants's health physics staff, ALARA implementation, Radiation Work Permits for compliance to plant procedures, personnel exposure records, observation of work and personnel in radiation areas to verify compliance to radiation protection procedures, and control of radioactive materials.

a. Corroded RTD Reference Junction Box Temperature Connections.

On June 8, 1989, the licensee found a corroded connection on an RTD which is used to measure the reference junction box temperature for "B" main feedwater temperature to "B" steam generator. The corroded connection caused the RTD to read high. TFW-2000B is a computer point used in the calorimetric procedure and the error difference in temperature between TFW-2000B and the other two feedwater temperature trains was as great as 8 degrees.

The licensee performed an analysis to determine the effects of the error by reviewing the OST procedures which had been performed from May 1 to June 6, 1989. The worst case error was calculated for each OST and was then added to the operators highest log readings. The highest "worst case" power was 100.32 percent. The licensee corrected the problem on June 6, 1989. The licensee notified NRC of the event on June 20, 1989.

No violations or deviations were identified.

3. Surveillance Observation (61726)

Portions of the following surveillance inspections and tests required by the TS were observed or reviewed by the inspectors:

OST-1023 - Off-site Power Availability Test
OST-1027 - ECCS Valve Breaker Verification
OST-1006 - Boration Flow Path Verification
OST-1011 - Auxiliary Feedwater 1A-SA Operability
OST-1026 - RCS leakage
MST-E0006 - 480 VAC molded case circuit breaker test

The inspectors verified that the surveillances were performed in accordance with adequate procedures; instrumentation was calibrated; limiting conditions were met; test results met acceptance criteria and were reviewed by personnel other than the individual directing the test; deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel; and personnel conducting the test were qualified.

No violations or deviations were identified.

4. Monthly Maintenance Observation (62703)

The inspector observed/reviewed the following maintenance activities of safety related and non-safety related systems and components to ascertain that they were conducted in accordance with approved procedures, regulatory guides, industry codes and standards, and were in conformance with TS:

a. Brown Boveri LK16 Switchgear

There has been a problem with non-safety related LK16 breakers failing to open on demand. The manufacturer was brought in to resolve the problem. The manufacturer added an additional opening spring to a spare LK16 breaker and then performed preventative maintenance and adjustments. The breaker was then sent to a testing lab and the breaker failed to open during the first test. An additional spring was added at this point and the breaker was sent back to the testing lab where it passed the test. It was also noted by the inspectors that due to manufacturing differences, the stationary arcing contact compression springs were found to have compression variances of over 100 percent. The springs cause the stationary contacts to clamp the movable contacts, and the variation in spring tension causes the opening force for the breaker to vary. The springs are not adjustable.

The non-safety related breakers are failing to open on demand. The only accurate count of operations indicates that 30 operations is enough to cause the failure. The plant has approximately 30 safety related LK16 breakers and there is no apparent physical difference between the safety versus non-safety breakers. The application is different in that the safety related breakers are not required to

cycle excessively because their circuits have motor controllers. The manufacturer stated that approximately 5000 LK16 breakers have been sold.

The inspectors will continue to follow the licensee's action on this item (IFI 89-13-01).

b. Molded Case Circuit Breakers.

In response to NRC Bulletin No. 88-10, nonconforming molded-case circuit breakers and subsequent suspect breakers discovered during an inspection by quality assurance, the licensee replaced ten plant installed safety related breakers. During the replacement process the inspectors noted that breakers were failing to meet testing requirements, specifically the instantaneous trip rating test. It was also noted that following the high amperage testing, two breakers would no longer stay closed during normal operational transients.

The inspectors reviewed the testing procedures, observed various breaker tests and discussed breaker testing methods with the licensee's engineering and maintenance staffs. Recently purchased safety related breakers were not meeting the testing requirements and the testing was causing contact pitting. At this point the technical support staff recommended cessation of instantaneous trip testing. It was also noted at this time that the manufacturer's trip curves had increased by 100 percent, thus doubling the instantaneous trip current acceptance criteria. The inspectors reviewed the containment electrical penetration protection curves to verify that the increased instantaneous trip values were still acceptable. The curves provided sufficient detail and proved that the penetrations were adequately protected for the increased trip values. The modification packages for changing the breaker trip curves were reviewed and appeared to be adequate.

The inspectors also inspected the testing equipment. The equipment appeared to be inadequate for performing the instantaneous current trip rating verification. A breaker manufacturer technical representative was brought on site to resolve the breaker failure and testing problems. The technical representative stated that the breakers designated by the licensee as not meeting acceptance criteria, would probably be found acceptable following the manufacturer's testing using more accurate test equipment. An additional technical representative will be brought on site to assist the licensee in developing the proper test equipment and procedures.

The inspectors will continue to follow the licensee's action on this item (IFI 89-13-02).

5. (Closed) TI 2500/20, Inspection to determine compliance with ATWS Rule, 10 CFR 50.62

The ATWS Mitigation System Actuation Circuitry (AMSAC) provides a means to automatically trip the turbine and actuate auxiliary feedwater flow in the event of a complete loss of feedwater transient. This system was installed during the first refueling outage. It has been tested and is operational. The AMSAC system is independent of, and isolated from, the existing RPS from sensor to output actuation device.

The system uses the output from existing steam generator narrow-range level sensors which are fed into a microprocessor based AMSAC controller. The controller monitors turbine first-stage pressure to identify turbine load above 40 percent. With AMSAC armed, and the controller identifies a coincident low level in two out of three steam generators, a turbine trip and auxiliary feedwater will be initiated after a time delay of 360 seconds. This is to ensure the RPS trip functions have had time to actuate.

The inspectors reviewed the completed system, certain documentation and testing to determine that system design, installation, and testing requirements have been complied with and that the system performs as designed. AMSAC is powered from non-safety related power supplies which are independent of the RPS. Maintenance at power can be done by inhibiting the operation of the AMSAC's output relays. This is displayed in the main control room by status lights and annunciator. Operating bypass (C-20) is used by the operators during startup below power levels of 40 percent. C-20 will automatically rearm AMSAC logics above 40 percent power. The system is tested during refueling outages. During power operation the system can be tested with AMSAC douputs bypassed.

The licensee has revised operating procedures to include operation of the AMSAC system. The operators have been given training on the system.

The inspectors had no further questions. This item is closed.

6. (Closed) IEB 89-01, Failure of Westinghouse Steam Generator Tube Mechanical Plugs

The licensee's response of June 14, 1989, states that "No Westinghouse mechanical plugs manufactured from the suspect heats (3279, 3513, 3962, and 4523) have been installed in the steam generators at Shearon Harris Nuclear Plant".

Records verify this statement to be true. This item is closed.

7. Exit interview

The inspection scope and findings were summarized during management interviews throughout the reporting period and on June 20, 1989, with those persons indicated in paragraph 1. The inspection findings listed

below were discussed in detail. The licensee acknowledged the inspection findings and did not identify as proprietary any material reviewed by the inspector during the inspection.

<u>Item Number</u>	<u>Description</u>
89-13-01	IFI - Failures of LK16 Brown Boveri Breakers (paragraph 4.a)
89-13-02	IFI - Instantaneous Current Trip Testing of Molded Case Circuit Breakers (paragraph 4.b)

8. Acronymns and initialisms.

ALARA	-	As Low As Reasonably Achievable
AMSAC	-	ATWS Mitigation System Actuation Circuitry
ATWS	-	Anticipated Transient Without Scram
ECCS	-	Emergency Core Cooling System
LCO	-	Limiting condition for Operation
LER	-	Licensee Event Report
MCB	-	Main Control Board
MFP	-	Main Feed Pump
MS	-	Main Steam
MSIV	-	Main Steam Isolation Valve
MST	-	Maintenance Surveillance Test
NRC	-	Nuclear Regulatory Commission
OP	-	Operating Procedure
OST	-	Operations Surveillance Test
PCR	-	Plant Change Request
PIC. Cab	-	Primary Instrument Control Cabinet
PMTR	-	Post Maintenance Test Requirements
QA	-	Quality Assurance
QC	-	Quality Control
RAB	-	Reactor Auxiliary Building
RCDT	-	Reactor Coolant Drain Tank
RCS/RC	-	Reactor Coolant System
RHR	-	Radiation Heat Removal System
RPS	-	Reactor Protection System
RTD	-	Resistance Temperature Detector
RWP	-	Radiation Work Permit
SF	-	Spent Fuel System
SG	-	Steam Generator
SIS	-	Safety Injection Signal
STA	-	Shift Technical Advisor
TFW	-	Temperature - Feedwater
TS	-	Technical Specification
VAC	-	Volt A.C.
WR/JO	-	Work Request/Job Order