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

Report Nos.: 50-424/90-32 and 50-425/90-32

Licensee: Georgia Power Company
P.O. Box 1295
Birmingham, AL 35201

Docket Nos.: 50-424 and 50-425 License Nos.: NPF-68 and NPF-81

Facility Name: Vogtle 1 and 2

Inspection Conducted: December 22, 1990 - January 18, 1991

Inspectors: _____ 2-5-91
B. R. Bonser, Senior Resident Inspector Date Signed

_____ 2-5-91
R. D. Starkey, Resident Inspector Date Signed

Accompanied By: P. A. Balmain

Approved By: _____ 2-5-91
P. Skinner, Chief Date Signed
Reactor Projects Section 3B
Division of Reactor Projects

SUMMARY

Scope: This routine inspection entailed resident inspection in the following areas: plant operations, maintenance, surveillance, and review of licensee event reports.

Results: One violation was identified for failure to perform a special condition surveillance which resulted in violation of TS. This violation was similar to a NCV documented in report 50-424,425/90-30. The immediate corrective actions of the previous event were ineffective in preventing this violation from occurring again - (paragraph 3.a).

Two examples of a continuing weakness were identified in the area of operator awareness and knowledge of operating status:

- Unit 2 control room operators, in clearing a Rod Deviation/Radial Tilt annunciator alarm, unknowingly removed the Proteus computer from scan which disabled the Rod Position Deviation Monitor alarm for all the control rods (paragraph 3.a).

- A Plant Equipment Operator mistakenly racked out the Unit 2 breaker for MDAFW pump 'B' instead of the Unit 1 MDAFW pump 'B' breaker - (paragraph 2.d)

DETAILS

1. Persons Contacted

Licensee Employees

*S. Chesnut, Manager Technical Support
*C. Christiansen, Safety Audit and Engineering Group Supervisor
*C. Coursey, Maintenance Superintendent
*T. Greene, Assistant General Manager Plant Support
H. Handfinger, Manager Maintenance
K. Holmes, Manager Training and Emergency Preparedness
*W. Kitchens, Assistant General Manager Plant Operations
*R. LeGrand, Manager Health Physics and Chemistry
*G. McCarley, Independent Safety Engineering Group Supervisor
R. Odom, Nuclear Safety and Compliance Manager
*W. Shipman, General Manager Nuclear Plant
J. Swartzwelder, Manager Operations

Other licensee employees contacted included technicians, supervisors, engineers, operators, maintenance personnel, quality control inspectors, and office personnel.

NRC Resident Inspectors

B. Bonser
*D. Starkey
*P. Balmain

*Attended Exit Interview

An alphabetical list of acronyms and initialisms is located in the last paragraph of the inspection report.

2. Plant Operations - (71707)

The inspection staff reviewed plant operations throughout the reporting period to verify conformance with regulatory requirements, Technical Specifications, and administrative controls. Control logs, shift supervisors' logs, shift relief records, LCO status logs, night orders and standing orders, lifted wires and jumper logs, and clearance logs were routinely reviewed. Discussions were conducted with plant operations, maintenance, chemistry, health physics, engineering support and technical support personnel. Daily plant status meetings were routinely attended.

Activities within the control room were monitored during shifts and shift changes. Actions observed were conducted as required by the licensee's procedures. The complement of licensed personnel on each shift met or exceeded the minimum required by Technical Specifications. Direct

observations were conducted of control room panels, instrumentation and recorder traces important to safety and operating parameters were observed to verify they were within Technical Specification limits. The inspectors also reviewed Deficiency Cards to determine whether the licensee was appropriately documenting problems and implementing corrective actions.

Plant tours were taken during the reporting period on a routine basis. They included, but were not limited to, the turbine building, the auxiliary building, electrical equipment rooms, cable spreading rooms, NSCW towers, diesel buildings, AFW buildings and the low voltage switchyard.

During plant tours, housekeeping, security, equipment status and radiation control practices were observed.

The inspectors verified that the licensee's health physics policies/procedures were followed. This included observation of HP practices and review of area surveys, radiation work permits, postings, and instrument calibration.

The inspectors verified that the security organization was properly manned and security personnel were capable of performing their assigned functions; persons and packages were checked prior to entry into the PA; vehicles were properly authorized, searched, and escorted within the PA; persons within the PA displayed photo identification badges; and personnel in vital areas were authorized.

a. Unit 1 Summary

The unit began the inspection period operating at full power. On December 25, power was reduced to 90% to remove heater drain pump A from service to repair a casing leak. Power was increased to 95% and secured due to a feedwater heater relief valve lifting. On December 29, power was reduced to 90% to replace this relief. The unit returned to 100% power on December 30, 1990 and operated at full power throughout the remainder of the inspection period.

b. Unit 2 Summary

Unit 2 began the period operating at or near full power and continued until a main feedwater pump shaft sheared on January 8, 1991, (paragraph 2a). The unit operated at approximately 70% power through the remainder of the period while repairs to the pump were underway.

c. ESF Actuation

On January 9, 1991, at 12:55 CDT, Unit 2 experienced a CVI initiated by a high radiation signal from 2RE-003, Containment Area Low-Range radiation monitor. All equipment responded properly to the CVI signal. Indications from other radiation monitors showed that there was not an actual high radiation condition and that the isolation was

caused by a spurious spiking of RE-003. RE-003 was declared inoperable and remained inoperable through this reporting period. The licensee determined that the most probable cause of the spurious spike was a failure within the detector assembly. Presently there are no spare detector assemblies on site. Repairs will be made during a future forced outage when a replacement detector assembly becomes available.

d. Improper MDAFW Pump Breaker Racked Out

On January 9, 1991, at 11:30 p.m. EST, as documented in DC 2-91-0005, a PEO was dispatched to the Control Building to rack out the breaker for the Unit 1 MDAFW pump 'B'. He mistakenly went to the corresponding breaker on Unit 2 and racked out the breaker for the Unit 2 MDAFW Pump 'B'. The unexpected condition was alarmed in the Unit 2 Control Room. Action was immediately taken to restore the MDAFW Pump 'B' to service. The 'A' train of AFW was operable during this event. This event is one of two examples in this report of a continuing weakness in operator awareness and knowledge of operating status.

e. Main Feed Pump Shaft-Shear

On January 8, 1991, with Unit 2 at 100% power, Main Feed Pump 'A' experienced a shearing of the drive shaft between the MFP turbine and MFP. The shear occurred near the turbine end of the shaft. The operators immediately received SG steam flow/feed flow mismatch alarms on all 4 steam generators. They observed that both MFP turbines were running at approximately 6000 RPM, but that MFP 'A' discharge pressure was only approximately 500 psig. The operators immediately manually inserted control rods, reduced main turbine load, and started emergency boration. Reactor power and turbine power were stabilized at approximately 54 percent power. Due to the prompt operator action, no engineered safety features or reactor protection systems were challenged or activated. Steam generator levels during the event approached the low-low steam generator level trip setpoint (37.8% narrow range) but levels were turned before the setpoint was reached. This event is noteworthy because the unit withstood a feed pump trip from 100% power without a resultant reactor trip. Unit 2 had recently expanded the narrow range level on the steam generators by lowering the lower tap (see IR 50-424, 425/90-28), resulting in additional operating margin. Later that day, reactor power was increased to 68%.

An event critique team was assigned to determine the cause of the failure and recommend corrective actions. As of the end of this report period, the critique team had not completed its evaluation. However, General Electric Company which manufactured the MFP turbine, has stated that several similar failures have occurred in the

industry over the past 20 years with this type turbine. The primary cause of those previous failures were shaft misalignment or inadequate lubrication of the flexible coupling. This resulted in overheating of the shaft and eventual metal failure. Discussions with the Vogtle GE site representative and the critique team leader indicated that one of these reasons was also the most probable cause of the failure of MFP 'A' on Unit 2 at Vogtle. A final determination on root cause has not been made.

f. Inverter Failure

On January 18, 1991, 120 VAC distributor panel 2NY2N experienced an interruption in power when the inverter supplying normal power failed. This distribution panel supplies two process control cabinets in the Westinghouse 7300 cabinets which power non-vital recorder drivers, controllers and instrumentation. The inverter failure resulted in numerous blown fuses in circuit cards in the cabinet racks. When the fuses were replaced not all the instrumentation was restored. The licensee determined that 56 cards in the two cabinets had failed due to the event.

The licensee assigned a critique team to determine the root cause of the event. Preliminary results indicated that a card failure within the inverter caused the inverter to fail resulting in a voltage spike which damaged the circuit cards in the process cabinets. The licensee's investigation into this event will be followed by the resident inspectors. At the end of this report period, the licensee had determined that they had sufficient cards on site to replace all the damaged cards and were beginning the process of replacing the cards. This event did not result in actuation of any safety systems, however, due to the card failures several instruments were lost in the control room which resulted in the operators having to manually control level in one steam generator and manually control VCT level.

g. Emergency Drill

On the evening of January 11, 1991, the Senior Resident Inspector observed an emergency drill on Unit 2. The drill scenario involved high RCS activity and possible fuel failure. There were several objectives of the drill:

* Demonstration of the ability to correctly classify an abnormal event

* Notification of off site agencies and on site personnel

* Demonstration for the proper operation of recall equipment

* Demonstration of the ability to recall off-duty personnel

* Activation of the emergency facilities

Overall, results of the drill were satisfactory and met the objectives. The licensee correctly classified the event as an Alert. The inspector and the licensee did note that additional training is still needed for the shift clerks. Initial notification of off-site agencies was made within the required 15 minutes, however, the shift clerk did require some prompting.

h. Elevated Feedwater Temperatures

During the week of December 11, 1990, the licensee observed indications of slightly elevated feedwater temperatures, main turbine first stage pressure, core delta T, and main generator electrical output, which could have been indicative of an unexplained increase in thermal power generation. Thermal power generation which is indicated by Proteus computer point U1118 remained below the TS limit defined as 3411 megawatts thermal. These indications trended upward until measurements taken on January 3, 1991 corresponded with less than a one percent increase in these indications from data measured on December 11, 1990. The licensee could not determine exactly why this power increase was occurring and on January 4, 1990 reduced power output of Unit 2 to approximately 99.5%. The licensee confirmed, under MWO 29100050, that the feedwater RTDs were in calibration and verified the validity of the Proteus U1118 thermal power calculation. No obvious anomalies were identified and the unit returned to 100% power on January 7, 1990. The licensee is acquiring a calibrated RTD from Southern Company to make local measurements of feedwater temperatures as the unit returns to full power following restoration of the 2A feedwater pump.

No violations or deviations were identified.

3. Surveillance Observation (61726)

Surveillance tests were reviewed by the inspectors to verify procedural and performance adequacy. The completed tests reviewed were examined for necessary test prerequisites, instructions, acceptance criteria, technical content, data collection, independent verification where required, handling of deficiencies noted, and review of completed work. The tests witnessed, in whole or in part, were inspected to determine that approved procedures were available, equipment was calibrated, prerequisites were met, tests were conducted according to procedure, test results were acceptable and systems restoration was completed.

Listed below are surveillances which were either reviewed or witnessed:

Surveillance No.	Title
14803-1, Rev. 7	CCW Pumps To Discharge Check Valves IST - CCW Pump 4
14842-1, Rev. 5	MSIV Stroke Test

87006-1, Rev. 1	Movable Incore Detector System Operating Instructions (data used for procedures 87007-C and 88023-C)
14804-2, Rev. 3	SI Pump B Inservice Test
14980-2, Rev. 9	Diesel Generator Operability Test

On January 7, 1991, the resident inspector observed the performance of procedure 54910-C, Security Diesel Generator Test, Rev. 2, which was conducted in response to a concern identified during a recent NRC Region II security inspection. The security equipment in question met the acceptance criteria of this special surveillance and adequately addressed the previously identified NRC concern.

- Failure To Perform Special Condition Surveillance

  On January 2, 1991, the Unit 2 Rod Deviation/Radial Tilt annunciator alarmed on the main control board several times due to a number of poor quality control rod position points in the Proteus computer. Control room personnel determined that the DRPI display and the control rod demand position indication had not deviated and that the alarm was invalid. Normally, the computer functions as the Rod Position Deviation Monitor and automatically scans DRPI and group demand position to verify the TS requirement that each rod is within the group demand limit of +12 steps. When the BOP operator cleared the alarm for the bad rod position points the computer scanning function was unknowingly removed thereby disabling the Rod Position Deviation Monitor alarm for all the control rods.

  On January 7, the system engineer while reviewing computer status found the rod position deviation monitor inoperable. The computer point which drives the alarm had been removed from scan on January 2, at 3:18 p.m. CST. The system engineer restored the scan on January 7, at 7:43 a.m. CST. During the time the scan had been removed the rod position deviation monitor alarm was inoperable and the special condition surveillance requirement of TS 4.1.3.2 which is applicable when the monitor is inoperable was not implemented. This surveillance requires that the Demand Position Indication System and the Digital Rod Position Indication System be compared at least once per 4 hours.

  During the period the rod deviation monitor was inoperable, operators did not note a deviation between the DRPI and the control rod demand position indication and continued at twelve hour intervals to perform the requirements of TS 4.1.3.2. This provides a degree of assurance that no condition existed which could have resulted in an undesirable flux variation in the reactor core.

This event is similar to an event which occurred on December 2, 1990. The event was documented as NCV 50-424/90-30-03 and in LER 50-424/90-021 dated December 26, 1990. Following the December event, the licensee's immediate corrective action included a shift briefing to the operating crews stressing the importance of procedural compliance. This immediate corrective action was not effective in preventing a similar incident.

The cause of this event was a failure of the operator to follow procedure 13504-C, Proteus Computer, when changing values in the computer. Also, the operator did not fully realize the impact of improperly changing values in the Proteus computer. The immediate corrective actions from the previous event were ineffective in that the operator in this case did not refer to the computer procedure or the annunciator alarm response procedure both of which provided guidance which could have prevented this event.

This event is identified as Violation 50-425/90-32-01: Failure To Perform Special Condition Surveillance Results in Violation of TS 4.1.3.2. This violation is a second example in this report of a weakness in operator awareness and knowledge of operating status.

One violation was identified.

4. Maintenance Observation (62703)

The inspectors observed maintenance activities, interviewed personnel, and reviewed records to verify that work was conducted in accordance with approved procedures, Technical Specifications, and applicable industry codes and standards. The inspectors also verified that: redundant components were operable; administrative controls were followed; clearances were adequate; personnel were qualified; correct replacement parts were used; radiological controls were proper; fire protection was adequate; quality control hold points were adequate and observed; adequate post-maintenance testing was performed; and independent verification requirements were implemented. The inspectors independently verified that selected equipment was properly returned to service.

Outstanding work requests were reviewed to ensure that the licensee gave priority to safety-related maintenance activities.

The inspectors witnessed or reviewed the following maintenance activities:

MWO No.	Work Description
19003990	Replace Relief Valves On FwH 6A To 6B
19004414	1 BYB Reactor Trip Bypass Breaker Replacement
29100071	Shaft From MFPT To MFP Is Sheared

19100240	Investigate and Repair CCW Pump 4 Outboard Bearing Smoking
29002463	2HV5113 TDAFW Pump Alternate Suction Valve From CST #2 - MOVATS

No violations or deviations were identified.

5. Review of Licensee Reports (90712)(92700)

The below listed Licensee Event Reports (LER) were reviewed to determine if the information provided met NRC requirements. The determination included: adequacy of description, verification of compliance with Technical Specifications and regulatory requirements, corrective action taken, existence of potential generic problems, reporting requirements satisfied, and the relative safety significance of each event.

a. (Closed) 50-424/88-27, Rev. 0, "Procedure Inadequacy Leads To Containment Ventilation Isolation."

The appropriate procedures have been revised to incorporate steps for the lifting of leads to prevent CVI actuations. An evaluation to implement CVI action blocking capabilities for RE-0002 and RE-0003 has been completed and clocking switches are scheduled to be installed by June 1, 1991. Finally, a broadness review was conducted to study corrective actions from this and previous similar events.

b. (Closed) 50-424/90-13, Rev. 0, "Improper Application Of Grace Period To Containment Air Lock Surveillance."

The VEGP surveillance tracking program was revised to ensure that the grace period provisions of TS 4.0.2 are no longer applied to the containment air lock leakage surveillance. A review of other surveillances for which application of a grace period is allowed by the TS was performed and it was verified that a grace period has not been applied to those surveillances.

c. (Closed) 50-425/89-25, Rev. 0, "Entry Into LCO 3.0.3 Due To Tripping Of ESF Room Coolers On Thermal Overload."

The heater coils installed in the thermal overload device for the affected relays were changed. This increased the trip settings of these overload relays. The thermal overload trip setting for all the Unit 2 and Unit 1 Auxiliary Building ESF room coolers were conservatively increased to the maximum allowed by procedure. The entire thermal overload relay device for the room coolers which had experienced the tripping problems were changed out to perform testing to determine root cause. Two of the thermal overload relay devices which were removed were sent back to the vendor, Eaton/Cutler Hammer, for investigation of possible generic concerns. Finally, the Shift

Supervisor who did not recognize that conditions for entering LCO 3.0.3 had occurred was counseled.

d. (Closed) 50-425/90-08, Rev. 0, "Manual Reactor Trip Following MSIV Closure Due To O-Ring Failure."

A temporary modification using a spacer and a smaller diameter o-ring was installed in place of the failed o-ring. A permanent modification was implemented during 2R1 which involved machining the boss to provide a better seating surface for the o-ring. Also, the manifold assembly mounting bolts for all Units 2 MSIVs were checked and were found to be torqued to the the specified valve. Additional corrective actions ensured that the +22 VDC power supply voltage for the Turbine EHC system was readjusted and that the ARVs were checked and determined to be opening within their allowable setpoint range.

e. (Closed) 50-425/90-09, Rev. 0, "Manual Reactor Trip Following Delays In Synchronization To Grid."

The Shift Superintendent was counseled. The unit operating procedure 12004-C was revised to identify procedural steps which are to be performed in the specified sequence unless sequence deviation is specifically authorized by the Manager Operations or higher authority. The revision to 12004-C also provided a new step for preparation of the main generator for synchronization which is intended to ensure early identification of problems which could prolong low power feedwater operation. Additionally, system operating procedures 13800-1 and 2, "Main Turbine Operation," were revised to provide instructions for desaturating the load set potentiometer and the failed PMG power supply was replaced.

f. (Closed) 50-425/90-16, Rev. 0, "Personnel Error Leads to Auxiliary Feedwater System Actuation."

The engineer involved with directing the performance of the response time testing procedure was counseled. Appropriate plant personnel were reminded that procedural steps must be followed in sequence unless deviations are allowed by procedure. A copy of this LER was placed in the Operations Reading Book to share lessons learned from this event. The test procedure was revised to add a warning that failure to follow steps in sequence may result in an ESF actuation. Similar procedures were reviewed and revised if necessary. Finally, plant management has identified a weakness in the area of procedural compliance and has taken steps to improve performance in this area during 1991.

No violations or deviations were identified.

6. Fuel Movement Activities (86700)

The licensee has for several weeks been moving spent fuel from the Unit 1 spent fuel pool to the Unit 2 spent fuel pool to permit the installation of vent valves on the SFP cooling lines in the Unit 1 pool. To accomplish this modification the Unit 1 pool must be drained below the minimum TS required level, thus all fuel must be removed from the Unit 1 pool.

On January 11, while inserting a BPRA unto a Unit 2 spent fuel rack, three thimble plugs were bent outward and interfered with the operation of the BPRA Handling Tool. The BPRA had been inserted to within approximately 15 inches of full insertion into the fuel rack and would not insert further. The apparent cause of this incident was equipment malfunction. The licensee responded by stopping any further attempts at moving the BPRA until a recovery plan could be devised and a procedure written. Subsequently, procedure 93160-C, Burnable Poison Rod Assembly Handling Tool Cooperating Instructions, was revised to include instructions for this particular problem. The three bent thimble plugs were later straightened enough to permit removal of the BPRA from the fuel rack. The BPRA will be reinserted into the fuel rack when a fuel rack modification is made which will permit complete insertion even with the partially bent BPRA.

7. Exit Meeting

The inspection scope and findings were summarized on January 18, 1991, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection findings listed below. No dissenting comments were received from the licensee. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspectors during this inspection.

Item Number	Description and Reference
VIO 50-425/90-32-01	Failure To Perform Special Condition Surveillance Results In Violation Of 4.1.3.2.

8. Acronyms And Initialisms

AFW	Auxiliary Feedwater System
ARV	Atmospheric Relief Valve
BPRA	Burnable Poison Rod Assembly
CCW	Component Cooling Water System
CDT	Central Daylight Time
CST	Condensate Storage Tank
CVI	Containment Ventilation Isolation
DRPI	Digital Rod Position Indication
EHC	Electro-Hydraulic Control

ESF	Engineered Safety Features
EST	Eastern Standard Time
FWH	Feed Water Heater
GE	General Electric
HP	Health Physics
HV	High Voltage
IST	Inservice Testing
LCO	Limiting Conditions for Operations
LER	Licensee Event Reports
MDAFW	Motor Driven AFW Pump
MFP	Main Feed Pump
MFPT	Main Feedpump Turbine
MOVATS	Motor Operated Valve Analysis and Test System
MSIV	Main Steam Isolation Valve
MWO	Maintenance Work Order
NCV	Non-cited Violation
NPF	Nuclear Power Facility
NRC	Nuclear Regulatory Commission
NSCW	Nuclear Service Cooling Water System
PA	Protected Area
PEO	Plant Equipment Operator
PMG	Permanent Magnetic Generator
RCS	Reactor Coolant System
Rev	Revision
RPM	Revolutions Per Minute
RTD	Resistance Temperature Detector
SFP	Spent Fuel Pool
SG	Steam Generator
SI	Safety Injection System
TDAFW	Turbine Driven AFW Pump
TS	Technical Specification
VAC	Volts Alternating Current
VDC	Volts Direct Current
VEGP	Vogtle Electric Generating Plant
VIO	Violation