



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

Report Nos.: 50-424/88-32 and 50-425/88-40

Licensee: Georgia Power Company
P. O. Box 4545
Atlanta, Ga 30302

Docket Nos.: 50-424 and 50-425

License Nos.: NPF-68 and CPPR-109

Facility Name: Vogtle 1 and 2

Inspection Conducted: July 18-22, 1988

Inspector: Mark N. Miller
M. N. Miller

Aug 18, 1988
Date Signed

Approved by: T. E. Conlon
T. E. Conlon, Chief
Plant Systems Section
Engineering Branch
Division of Reactor Safety

8-23-1988
Date Signed

SUMMARY

Scope: This routine, unannounced inspection was conducted in the areas of an Unresolved Item (URI), Construction Deficiency Reports (CDRs), IE Bulletins, and work observation. In the instrumentation area, completed work of components and areas (rooms) turned over to the Start-up (Test) Group was examined. In the electrical area, work in progress and completed work for the installation of stainless steel cable tie wraps was examined.

Results: The licensee has made significant improvement for instrumentation by correcting two weaknesses, damage and loop calibrations. Instruments, tubing, and panels are now adequately protected from construction damage. Instrument loop calibration will be performed in addition to a loop check for all safety-related loops prior to fuel load, Paragraph 5. However, in the electrical area, engineering failed to contact the cable vendors concerning potential damage to cables during the installation of the stainless steel cable tie wraps. In the electrical and instrumentation areas, management has been observed to strongly encourage the identification of deficiencies and have proper corrective action taken.

One unresolved item was identified involving apparent damage to cables during the installation of stainless steel cable tie wraps, Paragraph 2.

No violations or deviations were identified.

REPORT DETAILS

1. Licensee Employees Contacted

- J. Adams, Lead I&C Engineer, Mechanical Discipline
- B. K. Basu, Supervisor, Electrical Design Engineering - Construction
- *S. Boutwell I&C Supervisor
- M. Duncan I&C, Supervisor
- *W. C. Gabbard, Senior Regulatory Specialist
- *E. Groover, QA Site Manager, Construction
- *H. Handfinger, Project Start-up Manager
- D. Herrin, Regulatory Compliance - Unit 1
- E. Laner, Supervisor of Electrical Design Engineering-Construction
- D. C. McAfee, Senior Engineer, Quality Control
- K. Pointer, Regulatory Compliance - Unit 1
- *A. Simonti, Project Duty Officer - Construction

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

Other Organizations

- D. B. Fugill, Senior Quality Control Engineer, Bechtel
- L. Suttinger, Senior Field Service Engineer, Westinghouse

*Attended exit interview

2. Electric Cables - Work Observation (51063)

The inspector was in the process of reviewing documentation for 50-424/425 CDR 86105, Improper Support of Cables in Vertical Raceways, Paragraph 4, and determined an examination of work was required. During the walkdown in the Unit 2 Control Building, a licensee employee commented that the Stainless Steel (SS) cable tie wraps had damaged cable in Class 1E vertical cable trays. The employee then directed the inspector to the cable chase in Room 175 of the Control Building.

In Room 175 cables in Cable Trays 2AE341TVADVA and 2AE341TVAEVA were examined where the SS tie wraps attached the cable bundles to the rungs in the cable trays (One SS tie wrap at a rung). In both cable trays, cables were identified as being severely deformed and appeared to be damaged by the SS tie wraps. The edge of the band of the SS tie wrap appeared to "dig" into the cable jacket. This condition is the result of the SS tie wrap being installed at an angle to the vertical cable bundle and the horizontal cable tray rung. The inspector then notified the licensee of his finding.

Discussions were held with Quality Assurance and Construction Electrical Engineering personnel to determine if the licensee was aware of the condition and what type of corrective action may be required. The licensee stated that they were knowledgeable that the band edge of the SS tie wrap could deform the cable jacket, but no damage would occur because the band edges are machined round (no sharp edges). The licensee further stated that QC inspectors had previously identified the condition and it was determined by Electrical Engineering that the SS cable ties would not damage cable jackets if installed by existing procedures.

The inspector reviewed the following documentation to determine if the installation procedure was adequate and met the requirements in the construction specification:

Bechtel Construction Specification X3AR01-E9 Revision 24,
Specification for Cable Installation and Cable Termination

Construction Procedure ED-T-07, Revision 13, Cable
Installation

Section E9.5.4.4 of Construction Specification X3AR01-E9, Revision 24, specifies SS tie wraps must be installed by trained personnel and that the Panduit installation tool(s) shall be set at the maximum tension level. It further specifies that the tools shall be returned to the factory after 3000 operations for refurbishing and inspection. The inspector and the licensee personnel agreed to examine work in progress to verify the craft were following the procedure requirements. They also agreed to examine in detail the completed installations in Room 175 of the Control Building previously mentioned.

SS tie wraps in the following Class 1E vertical cable trays were examined in the Control Building (CB) and the Diesel Generator Building (DG):

CB Room 175
2AE341TVADVA
2AE341TVAEVA
2AE341TYCJVA
2AE341TYCKVA

CB Room 12
2BE350TMAC

CB Room 259
2BE351TYAER2
*2BE351TVAER5
*2BE351TVADFR5

DG Room 2T4B
2BF8C3TQAB
2BE8C3TLAB

*Indicates work in progress

In Room 175, one of the SS tie wraps was removed from the most severely deformed cable in the cable bundle. The cable was Okonite Type A28, two conductor size 12. The cable jacket was examined and found to be deformed by the band edge of the SS tie wrap, but not cut. Several other cables

were examined and the Okonite Types A27 and A28 and Eaton types CL67 and 68 were identified as being the types most deformed. Okonite cables are used for control purpose and Eaton cables are used for instrumentation signals. In CB Room 259, the inspector observed the installation of SS tie wraps in Cable Trays 2BE251TVAER5 and 2BE351TVADFR5. These cable trays contained bundles approximately 3 to 3.5 inches in diameter. No cables were identified as being deformed. The electricians performing the work were trained to install the SS cable tie wraps and performed their work in a professional manner.

Further discussion was held with the licensee to review the results of the field installations. The inspector stated that in CB Room 175 the tension varied for the SS tie wraps on the same cable bundle at different rungs in the cable tray. No SS tie wrap was found to be loose. The condition which causes the cable jacket to deform appears to be excessive tension (tightness). The licensee again stated that adequate testing had been performed and the band edge of the SS tie wrap even at the worst angle of installation, would not damage the cable. The inspector stated that his concerns were (1) long term effects to cable jacket; (2) internal damage to shield and drain wire for instrumentation cable; and (3) internal damage or deformation of insulation which could lower voltage rating, causing failure due to high voltage transients. In addition, the licensee did not adequately address these issues. The licensee did not request from Okonite or Eaton what harmful effects may be caused by using SS cable ties which could "dig" into the cable jacket when installed as specified in Construction Specification X3AR01-E9 Section E9.5.4.4, Revision 24. Therefore, this issue is identified as URI 50-424/88-32-01 and URI 50-425/88-40-01, Apparent Damage to Cables During Installation of Stainless Steel Tie Wraps.

The licensee stated that both Okonite and Eaton will be contacted to address the issue of cable damage from SS tie wraps as installed by the requirements in Section E.9.5.4.4 of Construction Specification X3AR01-E9, Revision 24. The cable vendors will be requested to comment whether apparent damage or deformation to the cable jacket, conductors, or insulation will be sustained when the SS tie wraps are installed at an angle "digging into" the cable jacket and will the cables be qualified for the life of the plant at the same voltage rating under these conditions.

During the examination of the installation of SS cable tie wraps in Class 1E vertical cable trays, the inspector did not identify any other deficiencies or areas of concern.

3. Instrument Components and Systems - Work Observation (52053)

The inspector performed walkdowns in the Auxiliary Building and the Containment Building to observe completed work for damage and whether temporary protection is provided where needed to prevent damage. Instru-

ments and areas turned over to the Start-up (Test) Group were of special interest. The completed work examined was instrument installations, tubing runs, sensing lines, instrument valves, supports, racks and panels. Instrument tubing, sensing lines, and electrical cables to instruments are items that are susceptible to damage and were given special attention. In the Containment Building, instrument tubing and sensing lines for the Reactor Coolant System (RCS) flow transmitters were examined since substantial construction work was in progress. In addition the temperature sensors (RTDs) and cabling for T-hot and T-cold was inspected.

In the Auxiliary Building, the following areas were inspected:

Room 007	Room 106
Room 009	Room 108
Room 012	Room 113
Room 014	Room 115
Room 016	Room 122
Room 022	Room 123
Room 025	Room 127
Room 226	

The inspector did not identify any damaged instruments, tubing, sensing lines, racks or panel or observe any items which were not adequately protected.

4. Licensee Identified Items, 10 CFR 55.55(e) [92700]

(Closed) 50-424 CDR 86105 and 50-425 CDR 86105 Improper Support of Cables in Vertical Raceway - Reportable Per 010987 LTR

Background - The NRC identified an open item in SSER 4 regarding the seismic adequacy of plastic cable ties used to support seismic Class 1E cables in vertical cable trays. The issues involved the load capacity of the plastic cable ties and the effects of aging, embrittlement, plastic creep on the structural behavior of the ties over the life of the facilities. By letter dated December 22, 1986, the licensee provided justification for the use of plastic cable ties during the first fuel cycle of Unit 1 and committed to address the long-term effects of plastic cable ties by June 1, 1987. The NRC concluded that the use of plastic cable ties to support Class 1E cables in vertical raceways was acceptable for the first fuel cycle Unit 1.

By letter dated May 27, 1987, the licensee provided a response to the remaining issue regarding long-term effects. In its May 27, 1987, response, the licensee committed to use stainless steel cable ties to support cables in vertical cable trays.

By letter dated May 28, 1987, the licensee committed to complete installation of the stainless steel cable ties on the affected vertical cable tray runs for Unit 1 prior to restart following the first refueling outage. For Unit 2, the stainless steel cable ties for the long vertical cable tray will be installed during the final stages of construction in accordance with the schedule of area turnover to Nuclear Operations.

By letter and safety evaluation enclosure dated July 30, 1987, the NRC submitted to Georgia Power Company its acceptance of stainless steel ties for use in vertical cable trays for Vogtle Units 1 and 2. The safety evaluation enclosure specifies the stainless steel cable ties will be installed in Unit 1 before restart after the first refueling outage and will be installed in Unit 2 before fuel load. It further stated the open item is fully resolved for both units.

The inspector verified by reviewing Maintenance Work Order (MWO) 18802182 dated April 6, 1988, that stainless steel cable ties have been installed in the Train A vertical cable chase located in the Control Building of Unit 1. The remaining installations will be completed during the refueling outage. The inspector verified by performing walkdowns in Unit 2 that stainless ties have been and are being installed in Unit 2. This item is closed.

5. Licensee Action On Previous Enforcement Matters (92702)

(Closed) URI 50-425/88-10-02, Review the Requirements for the Performance and Acceptance Criteria of Instrument Loop Checks During Construction Acceptance Tests

CAT-E-08, Instrumentation, is the general Construction Acceptance Test (CAT) procedure used for implementing instrumentation calibration during the test phase prior to fuel load. CAT-E-08 requires the Maintenance Department to calibrate instrumentation using approved maintenance procedures in conjunction with CAT-E-08. These approved maintenance procedures are instrument/loop specific and have been developed for instrument, channel, or surveillance calibration requirements when the plant is operational.

Step 6.4 of CAT-E-08, Revision 4 required all components to be loop checked after initial calibration. The loop check was to be performed as a functional test to verify loop operability, not loop calibration.

Step 6.4, Loop Check [Safety Related] has been upgraded in Revision 5 of CAT-E-08 requiring the loop check to be a functional test verifying both loop calibration and operability. The requirements for determining loop accuracies have been incorporated in Figure 1, Calculation Sheet in CAT-E-08. The acceptance criteria specified for safety-related loops will be calculated by adding the tolerances for two components or taking the square root of the sum of the squares tolerances for three or more components in a loop.

The licensee stated all safety related instrument loops will be loop checked as specified in CAT-E-08, Revision 5, prior to fuel load. This will satisfy the requirements in IEEE Standard, IEEE Std 336-1971 (ANSI N45.2.4), Installation, Inspection, and Testing Requirements for Instrumentation and Electrical Equipment During the Construction of Nuclear Power Generating Stations, Section 6, Post-Construction Verification. Therefore, this item is closed.

6. IE Bulletins (92701)

(Closed) 50-424/88-BU-01 and 50-425/88-BU-01, Defects in Westinghouse Circuit Breakers (NRC Bulletin No. 88-01)

NRC Bulletin No. 88-01 (BU-88-01) requires all holders of operating licenses or construction permits for nuclear power reactors to:

- a. Determine the number and Class 1E use of five specific circuit breakers (Westinghouse DS-206, DSL-206, DS-416, DSL-416, and DS-420)
- b. Perform a short-term inspection of the welds on the three pole shafts and the alignment in the breaker closing mechanism
- c. Perform a long-term inspection on the remaining welds on the pole shaft and make a direct check of the alignment of the breaker closing mechanism
- d. Report by letters of confirmation to the NRC the completion of the inspections. These letters shall include the number of breakers of each type inspected, the number of breakers of each type requiring corrective action due to pole shaft welds not meeting acceptance criteria and the number of breakers of each type requiring corrective action due to mechanism alignments not meeting the acceptance criteria. (The inspection requirements and acceptance criteria is specified in Westinghouse Bulletin NS10-TB-87-11 dated December 1, 1987, with the exception listed in BU-88-01).
- e. Document and maintain records of inspections and corrective actions in accordance with plant procedures for Class 1E equipment.

The inspector examined the following documentation to verify the licensee had completed the requirements of BU-88-01 for Units 1 and 2.

Georgia Power Company letter SL-4446, 0887U, X7GJ17-C110 dated April 7, 1988, to NRC. This letter of confirmation addressed the initial requirements for Unit 1 and all the requirements of Unit 2.

Georgia Power Company letter SL--4871, 1069U, X7GJ17-V110, dated June 29, 1988, to NRC. This letter of confirmation addressed the remaining requirements for Unit 2.

Maintenance Procedure NO. 27765-C, Westinghouse Type DS-416 Circuit Breaker Maintenance, Revision 10, dated March 4, 1988. Revision 10 incorporated the weld and alignments inspection requirements (Paragraph 6.d).

Maintenance work orders (MWO) and associated QC inspection reports verifying the inspection requirements in Maintenance Procedure No. 22765-C Revision 10 had been performed.

MWO	1-88-00402(E)	Unit 1
MWO	1-88-01294	Unit 1
MWO	1-88-01295	Unit 1
MWO	1-88-01296	Unit 1
MWO	1-88-01297	Unit 1
MWO	2-88-03615	Unit 2
MWP	2-88-05603	Unit 2

This item is closed.

7. Exit Interview

The inspection scope and results were summarized on July 22, 1988, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results listed below. Dissenting comments were not received from the licensee.

(Open) URI 50-424/88-32-01 and 50-425/88-40-01, Apparent Damage to Cables During Installation of Stainless Steel Tie Wraps (Paragraph 2).