



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

Report No.: 50-425/88-13

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

Docket No.: 50-425

License No.: CPPR-109

Facility Name: Vogtle 2

Inspection Conducted: February 29 - March 4, 1988

Inspector: *R. W. Wright* 3/22/88  
R. W. Wright Date Signed

Approved by: *G. A. Belisle* 3/22/88  
G. A. Belisle, Section Chief Date Signed  
Division of Reactor Safety

SUMMARY

Scope: This routine, unannounced inspection was conducted in the area of electrical work activities

Results: No violations deviations were identified.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- D. Borowski, Electrical Quality Control (EQC) Supervisor
- \*D. Fiquett, Assistant Construction Project Manager II
- \*E. Groover, Quality Assurance (QA) Site Manager - Construction
- \*C. Hayes, Vogtle Quality Assurance Manager
- \*G. McCarley, Project Compliance Coordinator
- \*P. Rice, Vice President and Project Director

Other licensee employees contacted included construction craftsmen, engineers, technicians, QA/QC personnel, and office personnel.

#### NRC Resident Inspectors

- R. Schepens, Senior Resident Inspector - Construction (SRC)

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on March 4, 1988, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings. 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.

### 3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

### 4. Unresolved Items

Unresolved items were not identified during this inspection.

### 5. QA Inspection of Electrical Work Performance (35061)

The inspector examined various safety-related cable procurement, storage, handling, cutting, installation, pulling, routing, splicing, and termination operations. This inspection was performed to determine whether site work was being performed in accordance with NRC requirements and SAR commitments, that the QA/QC program was functioning in an effective manner to assure requirements and commitments were met, and that prompt and effective action was taken to achieve permanent corrective action on

significant discrepancies. Civil construction activities were previously examined and documented in NRC Inspection Report No. 50-425/88-14. Piping construction activities are currently being evaluated by the Vogtle SRC and will be documented in NRC Inspection Report No. 50-425/88-12, which will assess the acceptability of the licensee's Readiness Review Module No. 4, Mechanical Equipment and Piping.

- a. The following acceptance criteria were examined to verify the inspection objectives:

Bechtels Construction Drawings and Related Field Change Requests (FCRs) and Deviation Reports (DRs)

2X3D-CA-D02C, R2; E-FCRB-115P

2X3D-CA-D02D, R1; E-FCRB-146P

2X3D-CA-D02E, R1

2X3D-CA-D02F, R0

2X3D-CE-D09A, R1

2X3D-CE-D09B, R1

2X3D-CE-D09C, R0

2X3D-CE-D17B, R0

2X3D-CE-H02M, R0; DCN-1,2,3 4; E-FCRB-20,908, 21,442

2X3DF454, R11

CX3DF001, R22

CX3DF002, R14

CX3DF003, R12

Vogtle Field Procedures

ED-T-02, R12, Raceway Installation

ED-T-07, R12, Cable Installation

ED-T-08, R10, Cable Termination

GD-T-01, R15, Nonconformance Control

QA-A-01, R5, Qualification and Certification of Technical Inspections

Bechtel Construction Specification No. X3AR01, Section E9, Cable Installation and Cable Termination, R22

The inspector reviewed the above listed electrical work activity specification, procedures, and drawings to determine if the most recent revisions were used and in agreement with the SAR. Procedures were also examined to determine if they adequately described critical points, methods of installation and test hold points which properly reflect design intent.

Within this area, no violations or deviations were identified.

b. Field Inspection

Cable stored at the reel yard was observed being removed from the purchased reels, cut to predetermined lengths and either coiled in a Figure 8 configuration or placed on dummy reels of proper reel diameter to avoid twisting, kinking or violating the minimum cable bending radius. The following cables were observed:

| <u>EE-580 Card#</u> | <u>From</u> | <u>To</u> | <u>(Type Cable)<br/>Cable Length</u> |
|---------------------|-------------|-----------|--------------------------------------|
| 2BY2B16 SA          | 2BY2B16     | 2BCJB3306 | 510' (81E)                           |
| 2BY2B14 SA          | 2BY2B14     | 2BCJB3308 | 518' (81E)                           |
| 2BYC132 SA          | 2BYC132     | 2BCQHVC1  | 345' (81E)                           |

Several other non-safety related cables

The cutting, coiling, color coding, labeling, handling, and transporting of these cables were in compliance with applicable procedures. A random sampling of approximately one hundred cable reels stored outdoors in the reel yard, cutting area, and power block area identified that all reels were properly positioned on both ends with no cable in contact with the ground and that the cables were fitted with acceptable heat shrinkable or rubber end caps.

The inspector observed the crafts during the partial pulling operations for the following cables:

| <u>EE-580 Card #</u> | <u>From</u>  | <u>To</u>  | <u>(Type Cable)<br/>Cable Length</u> |
|----------------------|--------------|------------|--------------------------------------|
| 2BY2B16SA            | 2BY2B16      | 2BCJB3306  | 510' (81E)                           |
| 2BY2B14SA            | 2BY2B14      | 2BCJB3308  | 518' (81E)                           |
| 2AR3514SA            | 2AE340TQAFVD | 2AE445TQAA | 765' (A77)                           |
| 2AH2793ASA           | 2AE340TQAFVD | 2AE445TQAA | 770' (A77)                           |
| 2AH2791ASA           | 2AE340TQAFVD | 2AE445TQAA | 770' (A77)                           |

All cables were noted to be properly tagged, color coded at not more than five foot intervals, and routed in appropriated cable trays in agreement with the EE 580 card instructions. No minimum radius

violations or cable kinking were observed during these cable pulls. The inspector verified that multiple small clamp-on rollers were used properly and that free air space from tray to tray, conduit to tray, tray or conduit to equipment did not exceed three feet. The inspector did not notice any sharp tray edges requiring additional edge protection.

The inspector witnessed the termination splicing of power service cable No. 2AB1513HB to nuclear service cooling water motor 2-1202-W4-001-M03. This process utilized Raychem's Nuclear Motor Connection Kit (NMCK-4V-35-00). All work was accomplished satisfactorily in accordance with the vendors motor connection installation instructions which accompany each kit. The inspector also accompanied an EQC inspector during his inspection of the following completed cable conductor terminations located in various panels and cabinets in the Control Building:

| <u>Room No.</u><br><u>Panel/Cabinet ID</u> | <u>Cable Termination Nos.</u>   |
|--|---|
| RA 16<br>2-1623-D5-001                     | 2AH12975WA-1, 2AJ8208WA-2,<br>2AJ8212WA-2, 2ABC11WA-2,<br>2ABC14WA-2, 2ACDPUAXB-2,<br>2ACDPUAXA-2, 2AH12978WA-1 |
| RA 16<br>2-1625-D5-006A                    | 2BCDPUAXB-1, 2BCDPUAXA-1  |
| RA 16<br>2-1804-S3-A02                     | 2ACBEH01BSF-2, 2AR9960SA-2,<br>2AR9960SB-2, 2ACBEH01ESB-2,  |
| RA 22<br>2-1816-U3-014                     | 2AH12975WA-2, 2AR9960SA-1,<br>2AR9960SB-1, 2AH12978WA-2   |

One discrepancy concerning the use of an out of date wiring diagram (2X3D-CE-D090A,RO) was identified by the EQC inspector. Revision 0 of this wiring diagram identifies two cables with the identical cable number (2ACDPUAXA-2) entering panel 2-1623-D5-001, with each cable's conductors being landed on different terminal points. The EQC inspector found only one cable terminating in the panel and immediately proceeded to check with field engineering to find out if there were any changes to the controlled drawing. Field engineering identified that Revision 1 to the wiring diagram deleted the second cable; consequently, the cable terminations were correct as installed. Subsequent checking by the NRC inspector with document control personnel verified Revision 1 was current, and review of all other drawing revisions utilized determined this to be an isolated case of no safety significance. All conductors for the above cables were found to be lugged correctly and landed of the proper terminal points.

The inspector accompanied two EQC raceway inspectors during their inspection of miscellaneous segments of conduit assemblies, pull and termination box installations, and their anchorages. These items were inspected to verify proper size, type, location, separation, identification/color coding, routing, and anchorage in accordance with design drawings and procedure requirements. Raceway installation work inspected included EE 580 Card Nos 2NE444KSJ25, 2NE454RX003W, 2NE454RS022, and 2NRJB4816. A discrepancy punchlist item (Log No. EL13P-4330) was written by EQC for electrical termination box 2NEJB4816 for #14 bolts not being torqued and a #4 anchor bolt that did not achieve minimum (60 inch-pounds) torque capacity.

Field observations and discussions with randomly selected electrical contractor and GPC EQC personnel were conducted by the inspector to verify proper electrical work activity program implementation. The inspector concluded that the craft personnel possessed the required knowledge, skill, and training to perform their assigned tasks and were accomplishing their tasks in accordance with approved procedures. The inspector examined the Cleveland Electric (CE) cable termination certification log dated February 9, 1988. The inspector also verified the training and certification records for four termination electricians that were observed during work and found them qualified. Additionally, the training and testing records for eight observed cable pullers were examined and found satisfactory.

Within this area, no violations or deviations were identified.

c. Quality Control

The inspector reviewed the following inspection records generated for the above observed electrical activities to determine their adequacy, whether deficiencies submitted by the QC inspection personnel received proper corrective action as applicable, and if work and work controls were adequate:

- Raceway Installation Cards and Inspection Reports
- Equipment Installation and Associated Support Cards
- Conduit Installation and Associated Support Cards
- Discrepancy Punchlist Log No. EL13P-4330
- Cable Installation Cards and Inspection Reports
- Termination Installation Cards and Inspection Reports
- EQC Inspector Certification and Qualification Records

The inspector reviewed applicable QC procedures (paragraph 5.a) to determine if the frequency, timing, and acceptance criteria for the subject inspections were adequate. The number of EQC inspectors provided for the coverage of electrical work activities was satisfactory. Discussions were conducted with various EQC inspectors to determine if their knowledge was adequate and to determine whether their findings and concerns received proper management attention.

The inspector concluded that licensee and contractor management was attentive and responsive to QC inspector identified problems. The EQC inspectors observed were knowledgeable of their inspection functions and acceptance criteria, and were proficient in performing their assigned tasks.

Within this area, no violations or deviation were identified.

d. Nonconforming Items Reports

The inspector reviewed recently written deviation reports on electrical cable work activities to verify that corrective actions accomplished the following:

- Corrected the items
- Determined the cause of the deficiency
- Considered reportability to the NRC
- Instituted effective action to prevent recurrence
- Detect trends in discrepancies

The following electrical related deviation reports were reviewed:

- ED-16592, ED-16583, ED-16582, ED-16572
- ED-16567, ED-16566, ED-16561, ED-16558
- ED-16556, ED-16554, ED-16552, ED-ED-16550,
- ED-16549, ED-16545, ED-16544, ED-16532,
- ED-16529, ED-16526, ED-16523, ED-16521,
- ED-16519

The inspector reviewed the last two QC Deviation Trend Reports (87-6, 88-1) and the most recent Inspection Attribute Trend Report (88-1). No significant trends were identified in the electrical discipline.

Within this area, no violations or deviations were identified.

e. Materials and Equipment

The inspector examined certificates of conformance, test reports, and receipt inspection data for purchase orders PAV 3718 and PAV 3080 regarding cable observed terminated. The electrical cable suppliers were found to be on Bechtel's Approved Evaluated Supplier's List dated January 31, 1988. An examination of the electrical cable storage conditions in the reel yard and power block were satisfactory. All torque wrenches used by EQC for cable splicing operations and bolted electrical conduit/equipment support functions were observed to have current calibration stickers.

Within this area, no violations or deviations were identified.



f. Audit and Surveillance Reports

The inspector reviewed the following licensee conducted audits/surveillances which were performed on various phases of electrical operations:

|                 |   |
|-----------------|---|
| CP18-87/47      | QA Audit of Cable Pulling/Routing         |
| CP18-87/20      | QA Audit of Cable Routing                 |
| CP18/CP19-86/30 | QA Audit of Cable Routing and Termination |
| CP18-86/20      | QA Audit of Cable Routing                 |
| CP19-87/42      | QA Audit of Electrical Terminations       |
| CP19-87/06      | QA Audit of Cable Terminations            |
| CP19-86/11      | QA Audit of Cable Terminations            |
| CP17-87/24      | Conduit and Cable Tray Surveillance       |
| CP18-87/02      | Cable Control Surveillance                |
| CP19-87/28      | Raychem Heat Shrink Surveillance          |

These audits and surveillances were examined to determine if they were meaningful, effective, reflected quality performance, and whether corrective actions taken as a result of audit/surveillance findings were proper, timely and complete.

Within this area, no violations or deviations were identified.