



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

Report No.: 50-425/87-13

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: March 9-13, 1987

Inspectors:

R. W. Wright

4/10/87  
Date Signed

L. R. Moore

4/10/87  
Date Signed

Approved by:

G. A. Belisle  
G. A. Belisle, Chief  
Quality Assurance Programs Section  
Division of Reactor Safety

4/10/87  
Date Signed

SUMMARY

Scope: This routine, unannounced safety related inspection was conducted in the areas of in-depth QA inspection of civil (rebar installation, cadweld splicing, Category I backfill) activities and electrical work performance; and 10 CFR Part 21 inspection.

Results: No violations or deviations were identified.

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## REPORT DETAILS

### 1. Licensee Employees

D. Bailey, Civil Quality Control (CQC) Inspector (Rebar/Cadwelding Level II)  
N. Boeticher, CQC Inspector (Soils Level II)  
D. Borowski, Quality Control (QC) Electrical Supervisor  
A. Chestnut, CQC Supervisor, (Soils Level II)  
C. Coalson, CQC Inspector (Soils Level II)  
A. Colman, QC Electrical Inspector  
J. Conyers, Quality Circles/Problem Solving Team  
M. Finch, Electrical Systems Completion Manager  
\*E. Groover, Quality Assurance Site Manager  
S. Haltom, Quality Assurance Engineering Support Supervisor  
G. Peel, Jr., CQC Section Supervisor  
T. Rushing, QC Supervisor-Training Coordinator  
R. Snyder, CQC Inspector (Laboratory Cadweld Testing Level I)  
J. Wikel, CQC Inspector (Rebar/Cadwelding Level I)

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

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on March 13, 1987, with those persons indicated in paragraph 1 above. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspector during this inspection.

### 3. Licensee Action on Previous Enforcement Matters (92702)

This subject was not addressed in the inspection.

### 4. Unresolved Items (92701)

Unresolved items were not identified during this inspection.

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

The inspector examined the preliminary reinforcing steel installation inspection and documentation activities for a control building roof slab (Concrete Placement No. A-112-070); the reinforcing steel splicing (cadweld) operations, inspection, and testing activities for cadwelds

installed in concrete placement No. 2-072-005A; and various aspects of the backfill program including the placement, compaction, inspection and testing of Category I backfill at the North East corner of diesel generator building No. 2. This inspection was performed to determine whether site work was being performed in accordance with NRC requirements and SAR commitments, the QA/QC program was functioning in a manner to assure requirements and commitments were met, and that prompt and effective action was taken to achieve permanent corrective action on significant discrepancies.

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

Bechtel Construction Drawings and Related Field Change Requests (FCRs)

Drawing No. AX2D11A060, R8

C-FCRB-20987

C-FCRB-21985

Drawing No. AX2D11A052, R11; and 59, R10

Drawing No. AP112453, R1; 92, R1; and 93, R1

Drawing No. 2P07A20, R2

Drawing No. 2X2D94V021, R15

Vogtle Field Procedures

CD-T-01, R17, Earth Work Quality Control

CD-T-06, R10, Rebar and Cadweld Quality Control

CD-T-07, R8, Embed Installation and Inspection

GD-A-04, R12, Calibration and Control

GD-A-06, R6, Reporting of Defects and Noncompliance to the Nuclear Regulatory Commission

GD-T-01, R15, Nonconformance Control

QA-04-02, R10, Significant Deficiency/Defect Reporting (10 CFR 50.55(e)/10 CFR 21)

QC-A-01, R4, Qualification and Certification of Technical Inspectors

QC-A-02, R5, Inspection Training Requirements

## Specification X2AP01

### ERICO Products, Inc., Catalog and Literature

The inspector reviewed the previously listed acceptance criteria utilized for the subject reinforcing, reinforcing splicing operations and backfill activities to determine if the most recent revisions were employed and in agreement with the SAR and to determine if these documents adequately describe critical points and methods of installation as well as inspection and test hold points which properly reflect design intent.

#### b. Field Inspection

The inspector found the rebar securely tied, clean, and held in position by spacers, chairs or other supports. The quantity of rebar, its size, length, radius of bend, spacing, lap length and cover were found to be in accordance with design drawings and specifications. Inspection coverage to verify the above rebar installation attributes was acceptable.

Rebar splicing activities were accomplished in accordance with the manufacturer's (ERICO) instructions. Splicing activities were continuously monitored by QC personnel. Test splices were taken at required frequencies and met both visual and tensile testing acceptance criteria. The inspector observed the cadwelders at work, conducted discussions with them and determined that their knowledge and experience of reinforcing steel splicing activities adequately provided the required quality of workmanship. The inspector examined the certification records for the cadweld splicers (stencils CS and FO) and found them qualified in the bar (No. 9) and positions (horizontal and vertical) they were observed working on.

Backfill activities were observed on March 12, 1987. The licensee's inspectors were observed monitoring the placement and compaction of the backfill and performing applicable tests. The silty fine sand backfill material was placed in four-inch thick uncompacted lifts and tamped with hand compaction equipment. The Category I backfill was required to be compacted to 97 percent of the maximum dry density determined as required by ASTM D1557. The inspector observed the field-density testing (sand cone No. 16299) in accordance with ASTM D1556 using a 12-inch sand cone. Field-density testing for this fill area was established at one sand cone per foot of compacted fill per 2000 square feet. Observation of the craftsmen indicated that they were placing, conditioning, and compacting the backfill per procedure.

#### c. Quality Control

The inspector reviewed the following inspection records associated with the above mentioned work activities to determine their adequacy, whether deficiencies submitted by QC inspection received proper

corrective action where applicable, and if work and work controls were adequate:

- Cadweld Inspection Reports
- Cadweld Tensile Test Report
- Soils Civil Daily Inspection Report
- Field Density Work Sheet - Sand Cone Method
- Certificates of Conformance
- Receipt Inspection Reports
- QC Inspector Certificates Records

The inspector reviewed applicable QA/QC procedures (paragraph 5a) to determine if the frequency, timing, and acceptance criteria for the subject inspections were adequate. The number of QC inspectors provided for the coverage of rebar installation, cadwelding, and backfill activities appeared satisfactory. Discussions were conducted with the rebar installation, cadwelding, backfill and laboratory testing QC inspectors to determine if their knowledge of the activities they were observed inspecting was adequate and to determine whether they felt their findings and concerns received proper management attention. The inspector concluded that licensee management was attentive and responsive to QC inspector identified problems. The QC inspectors observed were knowledgeable of their inspection functions and acceptance criteria and were proficient in the performance of their assigned tasks.

d. Nonconforming Items Reports

The inspector reviewed selected construction deviation reports for various rebar installation, cadwelding and backfill activities to verify that the corrective action accomplished the following:

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

Deviation reports reviewed included the following: CD-9173, 9176, 9189, 9199, 9210, 9159, 9147, 9111, 9175, 8676, 7849, 7215, 9110, 9148, 9061, and 9062. The QA section reviews deviation reports for all disciplines to identify potential trends or areas of concern that may be developing.

e. Materials and Equipment

Examination of the laboratory Forney Cadwell testing apparatus (Serial No. 69082 - 600K), the sand cone density test equipment (C-644, container No. 5), and triple beam scale (C-4142) utilized for the subject work were found to be in current calibration. The inspector witnessed the in-process cadweld tensile testing of sister splices 9TVF05 and 9TVCS140 and the inplace density testing (sand cone 16299) of the Category I backfill. Certificates of Conformance and Receiving Inspection Reports for cadwell sleeves type T-9001-A with Lot Nos. 2075-F-80 and S-2064-F-80 were examined and found to meet the purchase order requirements.

f. Audits

The inspector reviewed the following audit reports which were performed on various phases of reinforcing steel installation, cadwelding and backfill operations:

CP13-85/44	QA Audit of Concrete/Reinforcing Steel
CP13-85/75	QA Audit of Concrete/Reinforcing Steel
CP13-86/43	QA Audit of Concrete/Reinforcing Steel
CP12-85/42	QA Audit of Excavation and Backfill
CP12-85/67	QA Audit of Category I Backfill
CP12-86/33	QA Audit of Backfill/Excavation

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

Within this area, no violations or deviations were identified.

6. In-depth QA Inspection of Performance - Electrical

The purpose of this inspection was to verify that safety-related electrical work was being performed in accordance with NRC requirements, SAR commitments and implementing procedures, and to verify that the QA/QC program was functioning in a manner to ensure that requirements and commitments were being met. The inspector performed the following activities to verify licensee performance:

- Observation of electrical construction activity in progress.
- Discussions with QC and craft personnel regarding the scope and controls of work in progress.
- Verification of traceability of safety-related material to qualifying documentation.

- d. Review of the deficiency reporting system and its implementation.
- e. Review of previous and future QA audit coverage of safety-related electrical work.
- f. Review of QC coverage of this area.
- g. Review of QC qualification and training in the specific electrical work processes.

The following procedures were reviewed to determine the programmatic controls for construction phase safety-related electrical work:

- GD-T-01 Nonconformance Control, Revision 15
- GD-T-31 System and Area Turnover Verification, Revision 2
- QC-A-01 Qualification and Certification of Technical Inspectors, Revision 5
- ED-T-07 Cable Installation, Revision 11
- ED-T-08 Cable Termination, Revision 9
- SUM-17 System Punchlist, Revision 7
- SUM-19 System Turnover, Revision 11

The inspector observed cable installation work in process. The craft personnel transported and installed the cable with attention towards preventing damage to the material. Measuring and test equipment used to measure pull tension was in calibration and verified by the QC inspector.

Discussions with QC and craft personnel indicated that the personnel were knowledgeable of the activities in progress. The QC inspector at the job site demonstrated a thorough understanding of the procedural controls and the QC monitoring function for this activity. Both QC and craft personnel were familiar with cable separation requirements.

The cable installation procedure, ED-T-07, provided a checklist which the QC inspector utilized in assuring work quality. The checklist was adequately detailed to provide consistent guidelines regardless of inspector or variations in work conditions. This procedure was utilized by both craft and QC personnel and specified the responsibilities of all parties involved in the cable installation. No cable termination was in progress during the inspection, but review of the termination procedure, ED-T-08, indicated that this procedure was adequately detailed.

The inspector observed removal of cable from reels, labeling, and color coding. The cable was adequately labeled to maintain traceability to the reel from which it was removed and to the certifying documentation via the

reel purchase order number. The cable was cable code 81L, reel number 35, P. O. PAV. 2-154. Documentation for this cable was located in the vault and included certificates of conformance, test reports, receipt of inspection data and other documentation certifying the reel as 1E rated cable.

The inspector reviewed the program for identification, documentation, tracking, and close-out of nonconformances identified during the construction phase. Administrative guidelines for processing nonconformances or deviation reports (DR) were provided by Procedure GD-T-01. As DRs are initiated, they are entered onto a system punchlist on the Maintenance Tracking System (MTS). Items can be removed from this list by closure of the DR. In accordance with System & Area Turnover Verification procedure, the QC electrical supervisor must complete a checklist prior to system turnover verifying that all DRs associated with the system are closed or entered onto the MTS punchlist.

The MTS coordinator then assumes responsibility for tracking the DRs. The Startup Manual (SUM) system punchlist procedure categorizes these items, designating if the item is to be worked before/after turnover by construction/operations, and if work requires/does not require a maintenance work order (MWO) for accomplishment. Some items may be identified as "turnover exceptions" and are turned over as-is with the system. The SUM procedure assigns responsibility for coordination of punchlist item workoff and preparation of the system turnover package. The program appears to provide continuous tracking of DRs from initiation through turnover to operations where items can be entered into the operations maintenance tracking system to be completed as designated by operation's priority.

Approximately 270 DRs had been initiated on Unit 2 safety-related electrical work previous to this inspection and 80 of these had been closed. This compares to approximately 15,200 DRs identified on Unit 1 QC electrical work. From this value, it was apparent that Unit 2 safety related electrical work was in the initial phases and was estimated by QC personnel at five percent complete.

The inspector reviewed QA activities in the electrical area from 1986 to the present and the projected schedule for the next 18 months. The audits performed in 1986 were mainly directed towards completion of Unit 1 on the implementation aspect, although programmatic and training aspects were equally applicable to Unit 2. Corrective actions resulting from these audits were extended to Unit 2 activities. One audit had been performed specifically for Unit 2 activities during 1987. The audit schedule for 1987 appeared to adequately cover the electrical construction activities.

Approximately two surveillances and two audits were scheduled in each electrical area, cable installation, cable termination, and raceways for 1987. This schedule appeared to represent adequate QA coverage of safety-related electrical work for Unit 2.



Coverage for electrical construction activity by the QC group was directed towards in-process monitoring of work and verification of completed work to specific criteria. There were approximately 57 qualified QC electrical inspectors, the majority of these were Level II certified. The QC electrical inspectors were qualified in one or more of the following processes:

- Raceways Embed
- Cable Installation
- Cable Termination
- Electrical Equipment
- Cable Reel Control
- Drilled-in-Anchor Bolts

Criteria for qualification of inspectors was stated in procedures QC-A-01 and QC-A-02. The inspector reviewed a sample of QC qualification and training records which sufficiently documented the training/qualification status of the inspectors selected for review. Discussion with management indicated that the quantity and quality of the QC electrical staff appeared sufficient to meet the licensee's commitment to quality for safety-related electrical work.

Within this area, no violations or deviations were identified

7. 10 CFR Part 21 Inspection (36100 B)

The inspector verified that the licensee had posted 10 CFR 21 and Vogtle Field Procedure (VFP) GD-A-06, Revision 6, Reporting of Defects and Noncompliance to the Nuclear Regulatory Commission, at three conspicuous work areas for engineers, QA personnel, craft personnel, and others. The inspector verified that VFP GD-A-06 provided for posting and maintaining 10 CFR Part 21 and 50.55(e), Section 206 of the Energy Reorganization Act of 1974, and a copy of GD-A-06 at these locations. This procedure covers evaluating deviations and implementing reporting requirements within GPC. The inspector also reviewed QA Department Procedure QA-04-02, Revision 10, Significant Deficiency/Defect Reporting - (10 CFR 50.55(e)/10 CFR 21) which provided requirements and guidance for the identification and reporting of deficiencies/defects under 10 CFR 50.55(e) and/or 10 CFR 21 requirements. The Vogtle QA Manager is responsible for required coordination activities and the telecon and formal reporting of deficiencies/defects to the NRC for the Vogtle Project. VFP GD-T-01, Revision 15, Noncompliance Control, documents requirements for these activities. Evaluation of nonconformances is the responsibility of the QA Site Supervisor (QASS) per VFP GD-A-06.

The inspector examined the monthly status report (Correspondence No. PCC-441 dated February 12, 1987) for Vogtle Licensee Identified Items for Unit 2.

Within this area, no violations or deviations were identified.