



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

Report No.: 50-414/84-45

Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242

Docket No.: 50-41.

License No: CPPR-117

Facility Name: Catawba 2

Inspection Conducted: October 30 - November 2, 1984

Inspector: N. Merriweather 11-19-84
N. Merriweather Date Signed

Approved by: T. E. Conlon 11-19-84
T. E. Conlon, Section Chief Date Signed
Division of Reactor Safety

SUMMARY

Scope: This routine, unannounced inspection involved 24 inspector-hours on site in the areas of electrical cable installations, work and quality records, electrical equipment separation, storage of safety-related cables, and in-process inspection of cable splices.

Results: No violations or deviations were identified.

8412280256 841123
PDR ADOCK 05000414
Q PDR

REPORT DETAILS

1. Licensee Employees Contacted

- *R. L. Dick, Vice President Construction
- *T. B. Bright, Construction Engineering Manager
- *L. R. Davison, Project QA Manager
- *D. V. Ethington, Assistant QA Engineer
- *W. G. Goodman, QA Inspection Superintendent
- *D. P. Hensley, QA Technician
- *D. F. James, QA Technician
- *E. B. Miller, Senior QA Engineer
- *T. H. Propst, Construction - Mechanical Technician

Other licensee employees contacted included construction craftsmen and QC technicians.

NRC Resident Inspectors

- *P. K. VanDoorn

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on November 2, 1984, with those persons indicated in paragraph 1 above. The licensee was informed of the inspection findings listed below and there were no dissenting comments.

Unresolved Item 50-414/84-45-01, Separation Requirements Between Large Electrical Equipment (600 VAC Transformer No. 2ETXD) and Safety-Related Raceway, paragraph 6.b.

Unresolved Item 50-414/84-45-03, Verify that the Color Sequence Charts used by QC and the Craft are Correct and Controlled, paragraph 6.c.

Unresolved Item 50-414/84-45-04, Review the Procedures and Inspection Records for the Storage and Maintenance of Safety-Related Cables, paragraph 6.c.

Inspector Followup Item 50-414/84-45-02, Verify that the Routing of Cable No. 2*FW504 is Adequate, paragraph 6.b.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. New unresolved items identified during this inspection are discussed in paragraph 6.

5. Independent Inspection Effort (92706)

The inspector witnessed the in-process inspection of splices made on safety-related cables 2*NW552, 2*NW553, 2*NW557, and 2*NW549. The splices are the method used to terminate safety-related control cables to solenoid valves. The cables are spliced to cable pigtails extending from the solenoid valves inside metal terminal boxes. The splices were made in accordance with the following documents:

- CNS-1390.01-00-0074, Procedure for Installation of Insulation on Spliced and Bolted Connections for Class 1E Equipment Inside Containment and in the Inside and Outside Doghouses.
- CNS-1390.01-00-0113, Procedure for Making Field Splices for Safety-Related and Non-Safety Related Equipment Outside Containment - 600 Volts and Below
- Termination Drawing No. CN2731-03-03, Rev. 1.

The QC inspector and the electrician demonstrated a working knowledge of the above documents. The terminations (splices) were found to be acceptable in accordance with the requirements given in QC inspection procedure M41B, Serial No. 15 (Rev. 15). The splices were insulated by applying a heat shrinking insulation over the splice in accordance with Specification 1390-01-00-0074. The conductors were labelled in accordance with termination drawing CN2731-03-03. The inspector also verified by reviewing the foreman's log book that the crimping tool used had been properly checked for calibration in accordance with procedure CP-388 (Procedure for Checking Crimping Tools).

Within the area examined, no violations or deviations were identified.

6. Electrical (Cables and Terminations) - Observation of Work and Quality Records Review (51063 and 51065) - Unit 2

a. Documents Examined:

Procedure M41B, Serial No. 9 (Rev. 5), Cable Routing Installation

Procedure M41B, Serial No. 19 (Rev. 3), Electrical Cable, Cable Tray, Cable Tray Hangers Final Walkthrough Inspection

Procedure P-3 (Rev. 16), Special Storage Maintenance Inspection

Procedure CP-371 (Rev. 14), General Storage Requirements for Equipment and Materials

Procedure M41B, Serial No. 15 (Rev. 15), Cable Termination Inspection

Specification No. CNS-1390.01-00-139 (Rev. 2), Procedure for Handling, Storage, and Shipment of Cable

Specification No. CNS-1390.01-00-0020 (Rev. 2), Electrical Tolerances

Specification No. CNS-1354.02-00-0002 (Rev. 5), Multiconductor Switching Station Control Cable

Specification No. 1390.01-00-0018 (Rev. 28), Separation Requirements

Specification No. 1390.01-00-0022 (Rev. 10), Guide for Cable Installation - Cable Tray and Electray Systems

Specification No. 1390.01-00-00-0051 (Rev. 1), Cable Conductor Color Coded Cross Reference

Specification No. 1390.01-00-0126 (Rev. 6), Procedure for Tagging Electrical Cables

Specification No. 1390.01-00-0139 (Rev. 2), Procedure for Handling, Storage, and Shipment of Cable

Specification No. 1390.01-00-0140 (Rev. 1), Identification of QA Condition 1 Cable Raceways

The above documents were examined to determine the requirements for storage and maintenance of electrical cables, methods for cable installation, separation of raceways, identification methods for cables and raceways, cable terminations, and final QC acceptance requirements.

b. Field Inspection

The inspector selected the following safety-related cables for examination to verify that the installations were in accordance with procedures, specifications, and drawings.

Cable Nos.

2*EPL539	2*EPC525	2*EPC512
2*EPL554	2*EPC526	2*CA502
2*EPL537	2*EPC524	2*FW504
2*EPL529	2*EPC513	2*FW505
2*CA501	2*EPC511	2*FW539
		2*FW538

The above cables were inspected and verified to be installed in accordance with the above specifications and procedures. The cable routings were verified by walking the cable routes indicated on the pull cards from the "from and to" designations. The cables were the

correct type materials and were properly color-coded by painting. The terminations on cable numbers 2*FW538 and 2*FW539 were inspected at both ends of the cables. The terminations for cables No. 2*FW504 and 2*FW505 were inspected only at the "from" end (termination cabinet 2EATC8 and 2EATC5, respectively). The other cables identified above have not received a termination inspection by the licensee as of yet; however, they have been inspected for cable installation.

The cables and raceways were found to be properly identified, raceway loading met procedures, and cable separation was adequate. The separation between power cables inside cable trays did not always meet the required distance of $\frac{1}{2}$ the cable outside diameter. The licensee indicated that this will be corrected during the walkdown inspection (M41B, Serial No. 19) prior to system turnover. The inspector reviewed the procedure and verified that cable separation between power cables is addressed in the walkdown inspections.

The inspector observed in the electrical penetration and switchgear room that the 600 volt AC essential transformer 2ETXD (at column lines 69 and AA) was in direct metal to metal contact with a safety-related cable tray. The cable tray is seismically supported from the ceiling and the transformer is seismically anchored to the floor. The inspector informed the licensee that this installation appeared to be unacceptable in that the transformer and/or cable tray could be damaged during a seismic event. The inspector reviewed the drawings for the transformer and the cable tray (DWG Nos. CN-2876-01 and CN-2896-05, respectively) and determined that the maximum separation provided between the transformer and the cable tray is $\frac{1}{2}$ inch. The tolerance for location of electrical equipment is $\frac{1}{2}$ inch and the tolerance for location of cable tray is 1 inch.

The Tech Support Group is investigating this matter with design to determine what the required separation distances are. It appears that there are no specification requirements in this area. The licensee indicated that preliminary discussions with design concluded that a 1-inch separation would be necessary. The inspector informed the licensee that this item is considered unresolved until acceptability of the transformer and raceway installation can be established in accordance with specifications and procedures. This concern is identified as unresolved item 50-414/84-45-01, Separation requirements between 600V AC transformer 2ETXD and safety-related raceway.

One minor discrepancy was identified while examining the routing of cable No. 2*FW504. The pull card identified the last junction point of the cable routing to the termination cabinet (2EATC8) at the "from" location as junction point No. 22686. Based on the location of the tray it appears that the cable does not pass through this junction point. The area where the cable enters and exits the termination cabinet is very congested which makes it very difficult to determine if the cable actually goes through the junction point in question.

The licensee committed to review this matter further to determine its acceptability. This item was identified to the licensee as inspector followup item 50-414/84-45-02, Verify that the Routing of Cable No. 2*FW504 is Adequate.

Safety-related cables at Catawba are purchased in accordance with specification No. CNS-1354.02-00-0002 (Rev. 5). This specification requires insulated conductors to be permanently coded per ICEA-S-68-516 with no duplication of colors. It further requires the use of Table 5-2 of the Standard in cases where there are more than 20 conductors. Each conductor is a cable identified by conductor number and designated color.

Cable termination drawings indicate cable terminations by identifying the cable number, location where the conductors are landed, and the unique number for each conductor. To verify that the multiconductor cable is landed on the correct terminals a QC inspector must identify each conductor of the cable properly by conductor number or color code. The NRC inspector noted that craft and QC inspectors utilized tables cross referencing conductor numbers to its designated color code. The inspector questioned the licensee concerning the development and control of these tables. The licensee indicated that these tables were standard industry practice. The inspector observed two forms of the tables on site. One table indicates a date of October 25, 1976, and the other table is identified as Engineering Data Sheet ED-15, "Color Sequence For Control Cable" from Paranite Wire and Cable Division of the Essex Wire Corporation.

The inspector compared the two tables to each other and they appeared to be the same. The licensee requested design to transmit a copy of the standard ICEA-S-68-516 to the site; however, this information was not received prior to the exit meeting. These tables are not addressed in the termination procedures or installation specifications as far as could be determined. The licensee committed to review these tables against ICEA-S-68-516 to verify their correctness and to determine if these tables are necessary to be incorporated into the procedures or specifications. The inspector informed the licensee that this concern is unresolved and will be identified as unresolved item 50-414/84-45-03, Verify That the Color Sequence Charts Used by QC and the Craft are Correct and Controlled.

Within this area, no further concerns were identified.

c. Cable Storage Areas

The inspector toured the cable storage areas to verify that safety related cables were being stored and handled in accordance with procedures and specifications identified above. All safety-related cables were observed to have protective covers and were stored off the ground on timbers in accordance with Specification CNS-1390.01-00-0139 and nonconforming cables were clearly identified from conforming cables. The inspector discussed with craft personnel assigned to the cable yard the procedures for issuing safety-related cables to construction. They appeared very knowledgeable of warehouse operating procedures. This concluded the tour of the cable yard.

The inspector later reviewed procedure No. P-3, Special Storage Maintenance Inspections, and compared this procedure to Specification CNS-1390.01-00-0139, Procedure for Handling, Storage, and Shipment of Cables. The inspector noted that the specification contained inspection requirements which were not included in inspection procedure P-3. In particular, the concerns deal with the inspection requirements for periodic inspection (not to exceed 1 year) of each reel of cable stored outdoors and inspection during handling of cables. The periodic inspection is to verify the condition of the cable and document that it is being stored in accordance with the procedure. This inspection also looks for corrosion on the cable armor of nonjacketed cables.

The inspector discussed this concern with the originator of the specification and he indicated that this was not the intent of the specification to inspect each cable reel annually. Presently QC inspects the cable yards on a monthly basis in accordance with procedure P-3. However, they do not remove the protective covers on the cables to inspect for corrosion. In addition, they do not perform an inspection of the handling of the cable reels.

In Section 6.0 of Specification CNS-1390.01-00-0139 it states in part that information contained in Sections 5.2, 5.3, 5.4, 5.5 and 5.6 affect safety and shall receive QC inspection according to QA condition 1 requirements. QA has interpreted this statement to mean that they have the option to implement those requirements that they determine to be reasonable and necessary to achieve a quality installation. The inspector informed the licensee that if a requirement for inspection addressed in the installation specification was inappropriate it should be deleted from the specification. The licensee indicated that they would get a formal interpretation of this statement to verify that appropriate inspection items are incorporated in QA inspection procedure P-3.

The periodic inspection of the cable storage areas is required by QA procedure P-3. This inspection is normally performed on a monthly basis and is documented on form No. P3C. The inspector requested the QA records for the most recent QC inspections. The licensee could only find QA records for inspections performed up to February 1984 in the vault. The inspector later reviewed the procedure and found that it only states that a periodic inspection will be performed, it does not specify an interval for inspections. The licensee had identified this item during a review of the current procedure (P-3, Rev. 16) and the next procedure revision has changed this to indicate a monthly interval. This new revision will be implemented on November 4, 1984. The licensee also indicated that the cable storage inspections during the period March 1984 through July 1984 may not have been performed since the records could not be located in the vault. The licensee was aware of an inspection being performed in August 1984; however, this

report could not be located prior to the exit meeting. The inspector informed the licensee that both concerns involving inspection criteria not being included in Procedure No. P-3 (Rev. 16) and locating the inspection records for the cable storage inspections are unresolved and will be identified as unresolved item 50-414/84-45-04. Determine the Adequacy of the Procedures and Inspection Records for Special Storage and Maintenance of Safety-Related Cables.

d. QA Records Review (51065)

The inspector reviewed the receiving inspection reports and supplier's Quality Assurance Certifications for the following cable reels.

<u>Reel No.</u>	<u>Associated Cable No.</u>	<u>Type</u>
35826	2*FW504	12X12G1
35826	2*FW505	12X12G1
17322	2*FW539	19X12G1
018630	2*FW538	61X16G1
91458	2*EPL537	19X12G1
08388	2*EPL539	3X12G1
91458	2*EPL554	19X12G1
17475B2	2*EPL529	3X2G2
QC-82564-D	2*CA501	3X2G8
QC-93242-B	2*EPC525	3X500G8
QC-93241-B	2*EPC526	3X500G8
QC-93242-B	2*EPC524	3X500G8
QC-82484-B	2*EPC513	3X500G8
QC-82484-A	2*EPC511	3X500G8
QC-82509-B	2*EPC512	3X500G8
QC-82564-D	2*CA502	3X2G8

The records indicate that the cables meet procurement requirements, were properly identified, and approved for use by construction. The installation records (pull sheets) for the cables identified above were examined and were found to be acceptable.

Within the area examined, no violations or deviations were identified.