



UNITED STATES  
 NUCLEAR REGULATORY COMMISSION  
 REGION II  
 101 MARIETTA ST., N.W., SUITE 3100  
 ATLANTA, GEORGIA 30303

Report No. 50-370/80-9

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

Facility Name: McGuire

License No. CPPR-84

Inspection at McGuire site near Charlotte, North Carolina

Inspectors: T. D. Gibbons 7/25/80  
 T. D. Gibbons Date Signed

N. Merriweather for 7-25-80  
 N. Merriweather Date Signed

Approved by: T. E. Conlon 7-25-80  
 T. E. Conlon, Section Chief, RCES Branch Date Signed

SUMMARY

Inspection on June 24-27, 1980

Areas Inspected

This routine, unannounced inspection involved 54 inspector-hours onsite in the areas of electrical cables and terminations work and work activities; instrumentation cables and terminations work and work activities.

Results

Of the two areas inspected, three items of noncompliance were found in two areas (infraction - inadequate procedures for the inspection of safety-related cable terminations - paragraph 6; infraction - electrical test program - paragraph 6; infraction - failure to follow procedures for cable installation - paragraph 6).

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## DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*R. H. Ledford, Quality Assurance Engineer
- \*J. M. Hoover, Electrical Engineer
- \*T. E. Touchstone, Senior Construction Engineer
- H. K. Burriss, General Superintendent
- \*E. B. Miller, Senior QA Engineer
- \*M. S. Starnes, Senior QC Engineer

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on June 27, 1980 with those persons indicated in Paragraph 1 above. The items of noncompliance identified in paragraph 6 were discussed in depth.

### 3. Licensee Action on Previous Inspection Findings

Not inspected.

### 4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve noncompliance or deviations. New unresolved items identified during this inspection are discussed in paragraph 5.

### 5. Independent Inspection Effort

The inspector noted a bus intertie between the 125V DC bus powering safety channels 1 and 3; Channels 2 and 4. The inspector questioned the control of the breakers during normal operation to assure independence of each battery as required by Safety Guide 6. The licensee could not identify the control which would prevent inadvertent paralleling of the batteries. This item is identified as unresolved item 80-09-04, Control of the 125V DC bus intertie.

The inspector questioned the calibration of crimping tools. The licensee stated that there is no formal program. The craft have Go-No-Go gages which are used to check the tools. This checking of tools is not verified by QC. This is identified as inspector followup item 80-09-06 "Crimping Tool Verification".

Within the areas examined, there were no items of noncompliance identified.

6. Electrical (Cables and Terminations 1) - Observation of Work and Work Activities (Unit 2)

The inspectors selected the following safety-related cables for examination:

2\*FW502, 2\*FW503, 2\*NV528, 2\*NM510, 2\*NM504, 2\*NV527, 2\*RN681 and 2\*NV538

The above cables were examined to assure that the requirements of the PSAR and QAM were complied with in the areas of cable identification, type, terminations, location, routing, protection, separation, raceway supports, loading, construction procedures, inspection, nondestructive tests and nonconformance control. The as-built configuration was compared to the latest approved cable installation specifications, termination drawings and work records.

The inspectors examined cable terminations in motor operated valves 2\*NV141A, 2\*NV142B, 2\*FW1A, 2\*FW33A, 2\*NM191B and 2\*NM201A. The inspector observed that one conductor on terminal no. 9 in motor operated valve (MOV) 2\*NV142B was loose and that 6 conductors terminated in MOV 2\*NM191B could be moved easily by hand. The licensee's inspection procedure M41B Serial No. 15 Rev. 4 "Cable Termination" does not require inspection of terminations and connections for remote devices having one or two cables terminated inside the device. The inspection procedure does not require removal of termination box covers, therefore only a visual check can be made of external attributes which is inadequate. Duke Power Company's Topical Report 1A, Table 17.0-1 commits McGuire Nuclear Plant to conform to Regulatory Guide 1.30 which endorses ANSI N45.2.4. Paragraph 5.1.1 of ANSI N45.1.4 states in part, "inspections shall include ... verification of:

- (1) tightness of connections and fastenings
- (2) termination

This is an infraction and is identified as 370/80-09-01, Inadequate procedures for the inspection of safety-related cable terminations. During the examination of cable terminations in the MOVs listed above, the inspectors observed that the MOV operator housings for valves 2\*NV141A and 2\*NV142B had 6 inches horizontal separation; and the horizontal distance between valves 2\*FW1A and 2\*FW33A was approximately 6-8 inches. The electrical separation requirements for the redundant train cables were maintained up to the motor operator termination boxes. The inspectors questioned the licensee about the separation requirements for redundant MOV operator housings. The licensee is reviewing the separation requirements for redundant MOV operator housings. This item will be identified as inspector followup item 370/80-09-03, Separation requirements for redundant safety-related valve operator housings. While examining the terminations in MOVs, the inspectors observed that construction was using three different methods to terminate electrical conductors inside Rotork valve operators. The conductors were terminated using long barrel nuts, short barrel nuts and hex nuts. The licensee stated that the termination methods were approved by the vendor. The inspectors requested the vendor documentation that identified the three termination methods as acceptable. This item is identified as inspector followup item 370/80-09-02, Rotork terminations.

The inspectors questioned the licensee concerning electrical tests performed during construction. The licensee stated that prior to energization the electrical craft make a circuit test and red line a drawing. This test is not covered by any procedure, is not documented and there is no QC inspection. ANSI N45.2.4, paragraph 5.2 states: ". . . construction activities shall include test performed in accordance with written test procedures". This is an infraction and is identified as 370/80-09-05, Electrical test program.

While verifying the routing of the cables identified above, the inspector observed a 1½ inch diameter yellow train cable at junction point 8935 which violated the minimum bending radius. Inspection Instruction M41B, Serial 14 requires a minimum bending radius of 8 times the outside diameter in inches. The cable bending radius was measured at 10 inches by the QC inspector. The cable had been inspected during installation. This is an infraction and is identified as 370/80-09-07, Failure to follow procedures for cable installation.

Within the areas examined three items of noncompliance were identified.

7. Instrumentation (Cable and Terminations) Observation of Work and Work Activities

The inspector selected the following nine instrumentation cables 2\*EIA 517, 2\*EIA 518, 2\*EIA 519, 2\*EIA 520, 2\*EIA 521, 2\*EIA 522, 2\*FW 542, 2\*FW 543, and 2\*FW 544. The cables were examined to assure that the requirements of the PSAR and QAM were complied with in the areas of storage, handling, identification, nonconformance control, specified material, inspection, procedures, size, and type of cable, wireway seals, termination components, location, routing, separation, cableway identification, physical loading and terminations.

The noncompliances discussed in Paragraph 6 "Electrical Cables and Terminations are also applicable to this paragraph.