

Approved Exh. 42

FORM A-1C REVISION 0

<i>John D. B. 7-22-75</i>	
CORPORATE QA MANAGER	DATE

PROCEDURE M-40

PAGE CS-1

ELECTRICAL CABLE INSTALLATION AND INSPECTION

DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
QUALITY ASSURANCE
PROGRAM

REV. NO.	PREPARED		APPROVED	
	BY	DATE	BY	DATE
5	<i>L. W. Fair</i>	5/7/75	<i>M. J. ...</i>	7-22-75

COVER SHEET

List of pages, forms, and attachments valid for this revision:

Revision

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*Page 1A
Page 2
Page 3
Form M-40A
Form M-40B
Form M-40C

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A-42
11/17/83



ELECTRICAL CABLE INSTALLATION AND INSPECTION

DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
QUALITY ASSURANCE
PROGRAM

REV. NO.	PREPARED		APPROVED	
	BY	DATE	BY	DATE
4	LK Barnes	7-3-75	Miller	7-22-75

1. PURPOSE

This procedure establishes the requirements to control the field installation by inspection and documentation of electrical cabling.

2. SCOPE

This procedure covers the installation and documentation of all nuclear safety related cabling. Any other cables as deemed necessary by Duke Power Company Management may be included to effect a quality installation. Receiving Inspection shall be covered under Procedure P-1, Materials and Equipment Receiving Inspection.

3. RESPONSIBILITY

The Senior Quality Control Engineer shall be responsible for carrying out the inspection requirements of this procedure and for documenting this inspection. He shall also be responsible for initiating corrective action forms when found necessary during the course of inspection.

The Project Senior Quality Assurance Engineer shall be responsible for reviewing Random Inspection Worksheets and for approving completed Assurance forms as listed in Paragraph M40.6. He shall also be responsible for the evaluation of insulation dielectric test results as listed in Paragraph M40.4.4. The Senior QC Engineer shall be responsible for coordinating these tests.

4. PROCEDURE

- 4.1 Installation - Cables shall be pulled in accordance with Duke Power Company Cable Installation Data Cards unless shown on approved design drawings. Prior to pulling cables, main cable tray systems shall be continuous and junction points in the route shall be identified. Secondary supports not located on design drawings such as electray or conduit need not be in place prior to pulling the cable. Cable ends shall be protected from damage due to construction activities or water. Cable Termination and Temporary Identification Tags shall be inserted in plastic envelopes and attached to both ends of the cable. Cable Foremen shall enter reel number, sign, and date the Cable Installation Data Cards. Quality Control Inspectors shall verify reel number, sign, and date the card. Completed Cable Installation Data Cards shall be returned to the Construction Engineering Electrical Staff for accounting, the Quality Control Staff for verification and the Project Quality Assurance Staff for permanent records.

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<i>J. H. Webb</i>	7-24-75
CORPORATE QA MANAGER	DATE

ELECTRICAL CABLE INSTALLATION AND INSPECTION

REV. NO.	PREPARED		APPROVED	
	BY	DATE	BY	DATE
0	<i>L. W. Quinn</i>	5/7/75	<i>M. H. Webb</i>	7-22-75

DUKE POWER COMPANY
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Termination - Terminations to control cables will be made using Thomas & Betts (T&B) WT-145A or equivalent wire terminal installing tools. Where necessary, appropriate tools will be used to make power and special terminations. As each end of a cable is terminated, the

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J. M. B. 1-2-75
 CORPORATE CA MANAGER DATE

PROCEDURE M-40

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ELECTRICAL CABLE INSTALLATION AND INSPECTION

 DUKE POWER COMPANY
 CONSTRUCTION DEPARTMENT
**QUALITY ASSURANCE
 PROGRAM**

REV. NO.	PREPARED		APPROVED	
	BY	DATE	BY	DATE
3	K W Schmidt	8-29-74	<i>M. B.</i>	1-2-75

termination portion of the Cable Installation Data Card will be signed and dated by the terminator and returned to the Construction Engineering Electrical Staff for accounting, the Quality Control Staff for verification and the Project Quality Assurance Staff for permanent records. Permanent cable tags are not available, temporary cable identification tags will remain in the plastic envelope attached to the cable until permanent cable tags are installed. 3

- 4.3 Inspection - Cables defined in Paragraph M-40.2 shall be individually inspected for conformance with Duke Power Company's Drawings. Cable inspection shall verify size, type, color, routing, and reel number by signing and dating the Cable Installation Data Card in the spaces provided. Terminations shall be verified by signing the appropriate spaces on the cable termination card. After verification, all Cable Data Cards shall be returned to the Project Quality Assurance Staff for permanent records.

- 4.4 Testing - Cables requiring testing will be tested either by a Megger Test or a High Potential Insulation Test. Due to the infrequent use of the Megger Test for Cables, acceptance criterion shall be determined in individual cases by an Construction Engineer-Electrical or his designated representative. Acceptance criterion for Cable High Potential tests will be routinely determined by the EM&C High Potential Test Engineer, but may also be determined by the Construction Engineer-Electrical. Cables not requiring an Insulation Dielectric Test will receive a Dynamic Test during live voltage circuit analysis. All acceptance criteria must be approved by an Electrical Quality Assurance Engineer. 3

5. CORRECTIVE ACTION

Discrepancies, deviations, irregularities, and nonconforming items shall be reported and documented on either a Random Inspection Worksheet (Form M-40C) or a Nonconforming Item Report (Form Q-1A).

The Project Quality Assurance Staff shall review each Random Inspection Worksheet. Items which may be easily corrected during the construction phase and which need not be brought to the attention of higher management may be documented on a Random Inspection Worksheet (M-40C). Random Inspection Worksheets shall be consecutively numbered by the Project Quality Assurance Staff. A copy shall be maintained by the Quality Assurance Staff until the original is returned completed. A copy shall be maintained by the Quality Control Staff to be used as a "tickler" file until the original is returned for inspection. Significant items that 3

<i>[Signature]</i> 1-2-75	
CORPORATE CA MANAGER	DATE

ELECTRICAL CABLE INSTALLATION AND INSPECTION

DUKE POWER COMPANY
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3	K W Schmidt	8-29-74	<i>[Signature]</i>	1-2-75

the Project Quality Assurance Staff deems necessary to be brought to the attention of higher management shall be transferred to a Nonconforming Item Report (Form Q-1A) and resolved according to Procedure Q-1, Control of Nonconforming Items. Items requiring changes to design drawing or specification may be resolved according to Procedure R-3, Design Drawing and Specification Variation.

6. REPORTING

- (a) Form M-40A, Cable Megger Test
- (b) Form M-40B, Cable High Potential Test
- (c) Form M-40C, Random Inspection Worksheet
- (d) Cable Installation Data Cards

DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
PROJECT MEGUIRE

EXAMPLE

CABLE HIGH POTENTIAL TEST

CABLE TYPE 3XJ500 G5 WEATHER OVERCAST HUMIDITY 70% TEMPERATURE 27°C
TESTER IDENTIFICATION VON 289

CIRCUIT NUMBER	D.C. TEST KV	READINGS IN MICROAMPS EACH MINUTE									
		1 11	2 12	3 13	4 14	5 15	6 16	7 17	8 18	9 19	10 20
1ETA12	37	<u>11</u> <u>2</u>	<u>5</u> <u>2</u>	<u>3</u> <u>2</u>	<u>2</u> <u>2</u>	<u>2</u> <u>2</u>	<u>2</u> <u>2</u>	<u>2</u> <u>2</u>	<u>2</u> <u>2</u>	<u>2</u> <u>2</u>	<u>2</u> <u>2</u>
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CIRCUIT NUMBER	REMARKS

TESTED BY AA Able
APPROVED RR Raman

DATE 4-1-74
DATE 4-2-74

DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
PROJECT McGuire

Q.A. APPROVAL SS SmithDATE 10-2-74

RANDOM INSPECTION WORKSHEET

ITEM INSPECTED <u>Cable Tray Hangers</u>		UNIT <u>1</u>	WORKSHEET NO. <u>E-88</u>
LOCATION: COL./ELEV. <u>Avr. Bldg: HH-52/716</u>		REFERENCE DRAWINGS <u>MC-1901-01 Rev. 9</u>	
DISCREPANCIES NOTED <u>Two (2) bolts missing from hanger bracket on hanger</u> <u>HA1-1</u>			
EXAMPLE			
INSPECTOR <u>SS Sang</u>		DATE <u>10-1-74</u>	REVIEWED BY <u>SS Jones</u> DATE <u>10-1-74</u>
FIELD CORRECTIVE ACTION TAKEN		<u>Missing bolts installed.</u>	
		CORRECTED BY <u>SS White</u>	DATE <u>10-1-74</u>
DISCREPANCIES CORRECTED <input checked="" type="checkbox"/>	REINSPECTION DATE <u>10-2-74</u> INSPECTOR <u>AW Brown</u>		

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NUCLEAR REGULATORY COMMISSION
Docket No. 50-413 CHS P.A. No. 43
In the matter of Catawba
Staff ✓
Applicant _____
Interested _____
Contract 2011 _____
Contract _____
Other _____
Reported Ben Graham DATE 11/11/83
WITNESSES _____
RECEIVED ✓
RECEIVED ✓