SECTION 26 05 11
REQUIREMENTS FOR TESTING AND MAINTENACE OF ELECTRICAL DISTRIBUTION SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Test electrical equipment as described in the specifications and plans per NFPA 70B and NETA standards and provide documentation of all results. Equipment will include, transformers, switchboards, switchgear, panelboards, motor control centers, and other items and arrangements for the specified items as shown on the drawings.

B. These specifications cover the suggested field tests and inspections that are available to assess the suitability for continued service and reliability of electrical power distribution equipment and systems.

C. The purpose of these specifications is to assure that tested electrical equipment and systems are operational, are within applicable standards and manufacturer’s tolerances, and are suitable for continued service.

D. The work specified in these specifications may involve hazardous voltages, materials, operations, and equipment. These specifications do not purport to address all of the safety problems associated with their use. It is the responsibility of the contractor to review all applicable regulatory limitations prior to the use of these specifications.

E. The tests referenced in these documents are described in detail in the noted reference standards and are therefore not described in detail in these documents. Contractor must be certified as an expert in these testing procedures and shall be experienced in performance of these tests and maintenance procedures.

1.2 REQUIREMENTS

A. National Electrical Testing Agency (NETA), National Electrical Code (NEC) and National Fire Protection Association (NFPA) code NFPA 70B and standards are the minimum requirements for testing and documentation.

B. The drawings and specifications shall govern in those instances where requirements are greater than those stated in the above codes and standards.

C. The testing Contractor shall provide the following:

1. All field technical services, tooling, equipment, instrumentation, and technical supervision to perform such tests and inspections.
2. Specific power requirements for test equipment.

3. Notification to the owner’s representative prior to commencement of any testing.
4. A timely notification of any system, material, or workmanship which is found deficient on the basis of maintenance tests.
5. A record of all tests and a final report.

1.3 TEST STANDARDS

A. All testing shall be per either NFPA 70B, NETA standards or as described in the plans and specifications. Evidence of compliance shall include certified test reports.

B. Test Report:

1. The test report shall include the following:
   a. Summary of project.
   b. Description of equipment tested.
   c. Description of tests.
   d. Test data.
   e. Analysis and recommendations.
2. Test data records shall include the following minimum requirements:
   a. Identification of the testing organization.
   b. Equipment identification.
   c. Humidity, temperature, and other conditions that may affect the results of the tests/calibrations.
   d. Date of inspections, tests, maintenance, and/or calibrations.
   e. Identification of the testing technician.
   f. Indication of inspections, tests, maintenance, and/or calibrations to be performed and recorded.
   g. Indication of expected results when calibrations are to be performed.
   h. Indication of “as-found” and “as-left” results, as applicable.
   i. Sufficient spaces to allow all results and comments to be indicated.
3. The testing contractor shall furnish a copy or copies of the complete report as specified in the maintenance testing contract.

C. Test Equipment:

1. All test equipment shall meet the requirements in 1.3D and be in good mechanical and electrical condition.
2. Field test metering used to check power system meter calibration must be more accurate than the instrument being tested.
3. Accuracy of metering in test equipment shall be appropriate for the

test being performed.

4. Waveshape and frequency of test equipment output waveforms shall be appropriate for the test and the tested equipment.

D. Test Instrument Calibration:

1. The testing organization shall have a calibration program which assures that all applicable test instruments are maintained within rated accuracy for each instrument calibrated.
2. The firm providing calibration service shall maintain up-to-date instrument calibration instructions and procedures for each test instrument calibrated.
3. The accuracy shall be directly traceable to the National Institute of Standards and Technology (NIST).
4. Instruments shall be calibrated in accordance with the following frequency schedule:
   1. Field instruments: Analog and digital, 12 months maximum.
   2. Laboratory instruments: 12 months maximum.
   3. Leased specialty equipment: 12 months maximum.
5. Dated calibration labels shall be visible on all test equipment.
6. Records, which show date and results of instruments calibrated or tested, must be kept up-to-date.
7. Calibrating standard shall be of higher accuracy than that of the instrument tested.

1.4 QUALIFICATIONS (SERVICES)

A. Testing Qualifications: The testing contractor shall regularly and currently be involved in the Electrical Testing Industry for a minimum of five years. This contractor and all participating employees shall be NETA certified.

B. Testing Contractor performing these electrical test and inspections shall be trained and experienced concerning the apparatus and systems being evaluated. These individuals shall be capable of conducting the tests in a safe manner and with complete knowledge of the hazards involved. They must be able to evaluate the test data and make a judgment on the continued serviceability or nonserviceability of the specific equipment.

C. Testing Contractor shall have knowledge of and experience with the specific device under test. Additional personnel qualifications are as follows:

1. Testing Contractor shall require that each onsite crew leader shall hold a current NETA certification, Level III or higher, in electrical testing. This certification shall be in accordance with ANSI/NETA ETT-2010, Standard for Certification of Electrical Testing Personnel.

D. Documentation Qualification:

1. Contractor to submit sample documentation for each type of electrical equipment form approval of the COTR.
2. The Government reserves the right to require the Contractor to submit a list of prior hospital testing that they have performed before approval of said contractor.

1.5 APPLICABLE PUBLICATIONS

A. Applicable publications listed below shall apply.

1. NFPA 70, *National Electrical Code*, Latest Edition.
2. NFPA 70B, *Recommended Practice for Electrical Equipment Maintenance,* Latest Edition.
3. NFPA 70E, *Standard for Electrical Safety in the Workplace*, Latest Edition.
4. NFPA 99, *Standard for Health Care Facilities,* Latest Edition.
5. NFPA 101, *Life Safety Code*, Latest Edition.
6. NFPA 110, *Standard for Emergency and Standby Power Systems*, Latest Edition.
7. NETA *Acceptance Testing Specifications*

B. Products specified in all sections of Division 26 shall comply with the applicable publications listed in each section.

1.6 SAFETY AND PRECAUTIONS

A. All parties involved must be cognizant of industry-standard safety procedures. It is recognized that an overwhelming majority of the tests and inspections recommended in these specifications are potentially hazardous. Individuals performing these tests shall be capable of conducting the tests in a safe manner and with complete knowledge of the hazards involved.

1. Safety practices shall include, but are not limited to, the following requirements:
   a. All applicable provisions of the Occupational Safety and Health Act, particularly OSHA 29CFR 1910.
   b. ANSI/NFPA 70E, Standard for Electrical Safety in the Workplace.
   c. The Electrical Safety Program Book, Kenneth G. Mastrullo, Ray A. Jones, Jane G. Jones, NFPA.

d. Applicable state and local safety operating procedures.

e. Owner’s safety practices.

2. A safety lead person shall be identified prior to commencement of work.
3. A safety briefing shall be conducted prior to the commencement of work.
4. All test shall be performed with the apparatus de-energized and grounded except where otherwise specifically required to be ungrounded or energized for certain tests.
5. The testing organization shall have a designated safety representative on the project to supervise operations with respect to safety.
6. Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished in this manner for the required work, the following requirements are mandatory:

   a. Electricians must use full protective equipment (i.e., certified and tested insulating material to cover exposed energized electrical components, certified and tested insulated tools, etc.) while working on energized systems in accordance with NFPA 70E.

   b. Before initiating any work, a job specific work plan must be developed by the Contractor with a peer review conducted and documented by the COTR and Medical Center staff. The work plan must include procedures to be used on and near the live electrical equipment, barriers to be installed, safety equipment to be used, and exit pathways.

   c. Work on energized circuits or equipment cannot begin until prior written approval is obtained from the COTR.

7. For work that affects existing electrical systems, arrange, phase and perform work to assure minimal interference with normal functioning of the facility. Refer to Article OPERATIONS AND STORAGE AREAS under Section 01 00 00, GENERAL REQUIREMENTS.

1.7 WORK PERFORMANCE

A. All electrical work shall comply with the requirements of NFPA 70 (NEC), NFPA 70B, NFPA 70E, OSHA Part 1910 subpart J – General Environmental Controls, OSHA Part 1910 subpart K – Medical and First Aid, and OSHA Part 1910 subpart S – Electrical, in addition to other references required by contract.

B. Job site safety and worker safety is the responsibility of the Contractor.

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