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BuildingName
The Description of the Project
P00000000 0000

SPECIFICATION DIVISION 26

NUMBER SECTION DESCRIPTION

DIVISION 26 ELECTRICAL
SECTION 260800 - ELECTRICAL ACCEPTANCE TESTS

END OF CONTENTS TABLE

DIVISION 26 ELECTRICAL
SECTION 260800 - ELECTRICAL ACCEPTANCE TESTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

INCLUDE PARAGRAPH 1.1.A AND B IN EVERY SPECIFICATION SECTION. EDIT RELATED SECTIONS 1.1.B TO MAKE IT PROJECT SPECIFIC.

A. Drawings and general provisions of the Contract, Standard General and Supplementary General Conditions, Division 01 Specification Sections, and other applicable Specification Sections, in particular the Related Sections listed below, apply to this Section.

IN 1 BELOW, SELECT PROPER COMMISSIONING SPEC SECTION NUMBER APPLICABLE TO THE PROJECT.

B. Related Sections:

1. Section 019100/019110 - Commissioning
2. Section 017823 - Operation and Maintenance Manual

1.2 TESTS

A. Perform the visual inspections, manual operations and tests on systems and equipment as described in Part 3, "Execution".

B. Tests shall be performed and documented by an independent testing agency.

1.3 TEST REPORTS

A. Provide written test reports, signed and dated, for all tests prior to acceptance of the tested equipment by the Owner. Test reports on Megger, dielectric absorption and high potential tests shall include the ambient temperature and relative humidity existing at the time of the tests.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 VISUAL INSPECTIONS

A. Prior to any testing, perform visual inspections to verify the following:

1. The equipment is properly installed and anchored.
2. The equipment is free from damage and defects.
3. Shipping blocks and restraints have been removed.
4. Electrical terminations have been properly tightened.
5. The equipment has been properly aligned.
6. The equipment has been properly lubricated.
7. The ventilation louvers are open and unobstructed.

8. The equipment has been thoroughly cleaned inside and outside.
9. The equipment is properly labeled and labels are correct.
10. The equipment is ready to be tested.

3.2 MANUAL OPERATION

A. Prior to any testing, mechanical devices shall be exercised or rotated manually to verify that they operate properly and freely.

3.3 PRIMARY CABLE TESTS

A. Perform a continuity test, 2,500-volt DC Megger test, a DC high potential test, and a second 2,500-volt DC Megger test on primary cables. The high potential test shall be performed at 45kV for new cable and at 30kV when new cable has been spliced to existing cable.

3.4 POWER CABLE TESTS

A. Perform a continuity check and a 1,000 volt DC Megger test on 600 volt power cables No. 4 AWG and larger.

1. The Megger test shall be performed between each pair of conductors and from each conductor to ground.
2. The Megger test shall be performed for 15 seconds or until the insulation resistance value stabilizes.
3. The insulation resistance between conductors and from each conductor to ground shall be 100 megohms minimum in one minute or less. In addition, the lowest insulation resistance value shall not differ from the highest resistance value by more than 20 percent. But if the lowest value is above 1,000 megohms, the 20% balance requirement may be waived.

3.5 CONTROL CABLE TESTS

A. Perform a continuity check on control and instrumentation wiring.

3.6 ENGINE-GENERATOR SYSTEM TESTS

A. Perform a continuity check and 1,000 volt DC Megger test on the generator windings, generator circuit breaker, power circuit portions of the automatic transfer switch, and interconnecting power circuit wiring.

B. Perform a continuity check on the control wiring.

C. Calibrate the metering and time delay relays.

D. Perform the normal start-up testing recommended by the engine-generator manufacturer.

E. Perform a load bank test of overall system with a load bank rated at 100% preferred for a period of at least 120 minutes.

1. Open normal power to transfer switch and observe proper operation of engine-generator and automatic transfer switch (throwing over to emergency power), noting engine-generator start, time delays and other appropriate variables.

2. Close normal power and observe proper transfer back to normal and proper shutdown of engine-generator, again noting time delays and other appropriate variables.
3. Operate maintenance bypass switch to insure proper labeling and operation in all modes

F. Test operation of all generator control and alarm connections to the Automatic Transfer Switches, remote annunciator(s), the Fire Command Center, the fire alarm system, the BAS system, and accessories under all conditions.

3.7 PRIMARY SWITCH TESTS

A. Perform a continuity check, 2,500-volt DC Megger test, and a DC high potential test on primary switches. DC high potential tests shall be performed at 37kV on new and existing primary switches.

3.8 SUBSTATION TRANSFORMER TESTS

A. Perform a DC Megger test and a turns-ratio test on unit substation transformers. The DC Megger test shall be performed at 2,500 volts on coils rated over 600 volts, and at 1,000 volts on coils rated 600 volts and below. The turns-ratio test shall be performed on each tap.

B. Verify proper setting and operation of the fan control panel to insure it and the fans are operable and functional. Temperature-test the probes in each winding.

3.9 SECONDARY SWITCHGEAR TESTS

A. Perform a continuity check and 1,000 volt DC Megger test on buses, and on main and feeder breakers.

B. Perform a primary current injection test and a 'Ducter' (contact resistance) test on main breakers.

C. Perform a 1,000-volt DC Megger test and a turns-ratio test on CT's and PT's.

D. Calibrate the metering.

3.10 SERVICE, DISTRIBUTION AND MOTOR CONTROL EQUIPMENT TESTS

A. Verify proper phasing of power circuits.

B. Perform a 1,000-volt Megger test on buses, motor starters and disconnect switches. This test may be combined with the power cable Megger test by testing the equipment and terminated cables together.

C. Perform a continuity check on control circuits and control panel internal wiring.

D. Perform an operational test on the controls and alarms.

E. Perform a continuity check and a 1,000-volt DC Megger test on 3 phase distribution and isolation transformers.

3.11 MOLDED CASE CIRCUIT BREAKERS (MCCB) TESTS

A. MCCB's Rated 100 through 225 Amps (Units with fixed and electronic trip units)

1. Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with circuit breaker closed, and across each open pole. Removal of breakers from panelboards or enclosures is not required.
2. Perform a contact/pole resistance (ducter) test. Removal of breakers from panelboards or enclosures is not required.

B. MCCB's with Electronic Trip Units Rated 100 through 225 Amps

1. Test functionality of the trip unit by means of secondary current injection (Long-time pickup and delay, Short-time pickup and delay, Ground-fault pickup and time delay, Instantaneous pickup). Removal of breakers from panelboards or enclosures is not required. Prior to any testing, verify that all circuit breaker trip units are set in accordance with the approved short circuit and coordination studies.

C. MCCB's Rated 250 Amps and Above (Units with fixed and electronic trip units)

1. Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with circuit breaker closed, and across each open pole.
2. Perform a contact/pole resistance (ducter) test.
3. Test functionality of the trip unit by means of primary current injection (Long-time pickup and delay, Short-time pickup and delay, Ground-fault pickup and time delay, Instantaneous pickup). Prior to any testing, verify that all circuit breaker trip units are set in accordance with the approved short circuit and coordination studies.

D. Breaker testing shall be performed prior to termination of associated feeder/branch conductors.

E. Breaker testing shall be performed per NETA standards and in compliance with the recommendations contained in the manufacturers' published data. Testing shall be performed by a trained and certified ANSI/NETA technician.

INCLUDE PARAGRAPH 'F' IN SPECIFICATION SECTION AFTER EVALUATION OF POWER DISTRIBUTION SYSTEM AND COORDINATION WITH UM DESIGN MANAGER

F. For expansion and renovation projects, existing breakers associated with the project shall be tested per the requirements above.

3.12 MOTOR TESTS

A. Perform a 1,000-volt Megger test on 460 volt, 3 phase motors, and a 500 volt Megger test on 200 volt, 3 phase motors.

B. "Bump" motors to verify proper direction of rotation.

C. Run motors and check for vibration.

3.13 GROUNDING TESTS

A. Measure the resistance to ground of each ground rod before connection to the other ground rods. The resistance shall not exceed 10 ohms.

B. Measure the resistance to ground of the total ground system with all connections completed. The resistance shall not exceed 2 ohms for primary services or 5 ohms for secondary services.

C. Tests of the resistance to ground shall be made using either the three point method or the fall-of-potential method.

D. Perform a continuity check from equipment ground bus bars and ground lugs to the ground system.

3.14 FIRE ALARM SYSTEMS

A. Perform testing in accordance with NFPA 72.

3.15 HEAT TRACING CABLES AND MATS

A. Perform a continuity check, 500-volt DC Megger test and an operational test on heat tracing circuits prior to insulation of the pipe, tank, or gutter. Verify proper current draw and heating of the heat tracing.

B. Perform an operational test on the alarms as applicable.

3.16 COMMISSIONING

A. Perform Commissioning activities per Related Sections above.

END OF SECTION 260800