SECTION 260526 – GROUNDING AND BONDING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Contractor Provide:

1. Grounding electrode system.
2. Grounding for branch circuits and feeders.
3. Grounding for Control Circuitry.

1.2 DEFINITIONS

A. Equipment Ground Conductor:

1. The conductor that connects the noncurrent-carrying metal parts of equipment to the grounding electrode system or ground bus.

B. Grounding Electrode Conductor:

1. The conductor that connects the ground electrodes to the grounded circuit conductor and/or the equipment grounding conductor.

C. Grounded Circuit Conductor:

1. A circuit conductor, usually the neutral, that is intentionally connected to ground.

D. Made Electrode:

1. Any item, such as a ground rod, which is solely used to provide a ground connection.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with National Electric Code.
2. Comply with Public Authorities having jurisdiction.

B. Source Quality Control

1. The authority having jurisdiction will inspect the installation for compliance with governing codes.

1.4 REFERENCES. Specified references, or cited portions thereof, current at date of bidding documents unless otherwise specified, govern the work. In conflict between referenced standards and contract documents, notify Architect/Engineer immediately. Confirm notification in writing. Do not proceed with the work until the Architect/Engineer issues written instructions.

A. National Fire Protection Association (NFPA): NFPA 70 - National electrical Code (NEC).

B. Furnish products listed and classified by a Nationally Recognized Testing Laboratory (NRTL) as suitable for purpose specified and shown.

C. Manufacturers' Catalogs: Specification manufacturers' catalogs are incorporated by reference to same force and effect as if repeated herein in full.

D. ANSI C2 - National Electrical Safety code.

1.5 SUBMITTALS

A. Submit Product Data: Provide data for grounding electrodes and connections.

B. Submit Test Reports: Indicate overall resistance to ground in accordance with section 260553.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Connections:

1. All rod to rod, rod to cable, cable to cable, and cable to structural steel connections shall be by an approved exothermic or mechanical weld process.
2. Connections to metallic pipe may be by either exothermic weld or approved UL listed ground clamp.
3. Any splices to ground electrode conductors shall be exothermic weld only.

B. Terminating Lugs:

1. Exothermic weld, mechanical weld, or crimp compression type.

C. Wire:

1. Equipment grounding conductors shall be insulated. Insulation shall be 600 volt, same type as phase conductors, green in color. Use yellow tracer stripes to distinguish different grounding systems.
2. Ground electrode conductors shall be bare annealed copper.

D. Rod Electrode:

1. Material: Copper-Clad Steel.
2. Diameter: 3/4 inch.
3. Length: 10 feet.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide a separate equipment grounding conductor in all feeders and branch circuits, unless indicated otherwise on the drawings. Terminate each end on grounding lug, bus or busing.

B. Bond all raceways, cabinet enclosures, and non-current carrying parts of equipment to grounding system. Bond raceways such that a continuous path for current flow is maintained.

C. Separately Derived Systems:

1. Bond neutral of transformers to metal equipment enclosure or frame. Provide connection from enclosure to nearest metallic water pipe or structural steel member and to feeder ground.

D. Bond all grounding systems together. Size of bonding conductor shall be at least the size of the largest grounding electrode conductor.

E. Ground electrode conductors shall be run exposed whenever possible. If conduit is needed for protection, Schedule 40 PVC conduit shall be used. All cable clamps and conduit supports shall be designed so they do NOT totally encircle conduit or cable in metal.

F. All connections to the metallic water piping shall be made using either approved ground clamps or exothermic welds. All connections to structural steel shall be by the exothermic weld process.

3.2 SERVICE ENTRANCE GROUNDING

A. Ground electrical service neutral at service entrance equipment and at the generator. Connect main grounding electrode conductors to water piping with an approved ground clamp or exothermic weld. Make connections to flanged piping at street side of flange. Provide bonding jumper around water meter. Bond to ground ring as indicated on the drawings and at generator.

B. Provide grounding connection to the building foundation re-enforcement.

3.3 DATA SYSTEM GROUNDING

A. Provide grounding for data/communication system as indicated on the drawings. These grounding systems shall be solidly connected to the building main ground.

3.4 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of section 260553.

B. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

C. Use suitable test instrument to measure resistance to ground of system. Perform testing in accordance with test instrument manufacturer's recommendations using the fall-of-potential method.

D. Resistance measurement shall be from the system neutral connection at the service entrance to a convenient ground reference point. The ground reference point should be located to minimize the effects of other existing grounding electrodes.

E. Ground resistance shall not exceed 10 OHMS. When resistance exceeds 5 OHMS, one of the following measures shall be taken to reduce the ground resistance:

1. Drive and bond additional ground rods at two rod length intervals.
2. Treat the soil in the vicinity of the electrode with metallic salts.
3. Remove soil from around the electrode and replace with bentonite.
4. Use a UL approved electrolytic chemical ground rod.

F. All resistance tests shall be taken no sooner than 48 hours after a measurable rainfall.

END OF SECTION 260526