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To implement the design criteria described above, the Emergency AC and DC Power Systems have been designed using guidance from the following industry standards:

- For overall AC and DC power system design:

Institute of Electrical and Electronics Engineers (IEEE), IEEE Standard 308-1991, "IEEE Standard Criteria for Class 1E Power Systems for Nuclear Generating Stations." (IEEE, 1991)

- For overall DC power systems design:

IEEE Std 946-1992, "IEEE Recommended Practice for the Design of Safety Related DC Auxiliary Power Systems for Nuclear Power Plants," 1992 (IEEE, 1992)

- For equipment seismic qualification:

IEEE Std 344-1987, "IEEE Recommended Practices for Seismic Qualification of Class 1E Equipment for Nuclear Generating Stations," 1987 (IEEE, 1987)

- For equipment environmental qualification:

IEEE Std 323-1983, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations," 1983 (IEEE, 1983)

- For periodic testing:

IEEE Std 308-1991, "IEEE Standard Criteria for Class 1E Power Systems for Nuclear Generating Stations." (IEEE, 1991)

IEEE Std 387-1995, "IEEE Standard Criteria for Diesel Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations," (IEEE, 1995)

IEEE Std 338-1992, "IEEE Standard Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems," (IEEE, 1992)

NRC Regulatory Guide 1.118, Rev. 3, "Periodic Testing of Electric Power and Protection Systems," 1994 (NRC, 1994)

- For single failure design:

IEEE Std 379-1994, "IEEE Standard Application of the Single Failure Criterion to Nuclear Power Generating Station Safety Systems," 1994 (IEEE, 1994)

IEEE Std 603-1998, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations," (IEEE, 1998)

- For qualification and fire protection of cables installed in open cable trays:

IEEE Std 383-1992, "IEEE Standard for Type Test of Class 1E Electric Cables, Field Splices and Connections for Nuclear Power Generating Stations," 1992 (IEEE, 1992)

- For protection of Emergency Power Systems equipment from explosions due to hydrogen accumulation:

National Fire Protection Association (NFPA) 110, "Standard for Emergency and Standby Power Systems," 1999 (NFPA, 1999)

NFPA Standard 110A-1989, "Stored Electrical Energy Emergency and Standby Power Systems," 1989 (NFPA, 1989)

- For electrical independence and separation:

IEEE Std 384-1992, "IEEE Standard Criteria for Independence of Class 1E Equipment and Circuits," (IEEE, 1992), except where circuit breakers and fuses are used as isolation devices, two will be placed in series.

- For electrical equipment protection:

IEEE Std 741-1997, "IEEE Standard Criteria for the Protection of Class 1E Power Systems and Equipment in Nuclear Power Generating Stations," 1997 (IEEE, 1997)

IEEE Std 242-1986, "IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems," 1986 (IEEE, 1986)

- For design, capacity sizing, installation, testing, and maintenance of lead-acid batteries:

IEEE Std 484-1996, "IEEE Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications," 1996 (IEEE, 1996)

IEEE Std 485-1997, "IEEE Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications," 1997 (IEEE, 1997)

IEEE Std 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications,"

1995 (IEEE, 1995)

IEEE Std 1184-1994, "IEEE Guide for the Selection and Sizing of Batteries for Uninterruptible Power Systems," 1994 (IEEE, 1994)

- For design and installation of Class 1E transformers:

IEEE Std 638-1992, "IEEE Standard for Qualification of Class 1E Transformers for Nuclear Power Generating Stations," 1992 (IEEE, 1992)

- For design and installation of cable systems and Class 1E raceway systems:

IEEE Std 690-1984, "IEEE Standard for Design and Installation of Cable Systems for Nuclear Power Generating Stations," 1984 (IEEE, 1984)

IEEE Std 628-1987, "IEEE Standard Criteria for the Design, Installation, and Qualification of Raceway Systems for Class 1E Circuits for Nuclear Power Generating Stations," 1987 (IEEE, 1987)

- For design and installation of battery chargers, inverters, and uninterruptible power supplies:

IEEE Std 650-1990, "IEEE Standard for Qualification of Class 1E Static Battery Chargers and Inverters for Nuclear Power Generating Stations," 1990 (IEEE, 1990)

IEEE Std 944-1986, "IEEE Recommended Practice for the Application and Testing of Uninterruptible Power Supplies for Power Generating Stations," 1986 (IEEE, 1986)

- For design, installation, testing, and maintenance of diesel generator systems and diesel generator fuel oil systems:

IEEE Std 387-1995, "IEEE Standard Criteria for Diesel Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations," (IEEE, 1995)

IEEE Std 446-1995, "IEEE Recommended Practice for Emergency and Standby Power Systems for Industrial and Commercial Applications," 1995 (IEEE, 1995)

ANSI-ANS 59-51-1997, "Fuel Oil Systems for Safety-Related Emergency Diesel Generators," 1997 (ANS, 1997)

NFPA 30-1996, "Flammable and Combustible Liquids Code," (NFPA, 1996)

NFPA 37-1998, "Standards for the Installation and Use of Stationary Combustion

Engines and Gas Turbines,” 1998 (NFPA, 1998)

- For design, installation, measurement, and testing of grounding systems:

IEEE Std 142-1991, “Recommended Practice for Grounding of Industrial and Commercial Power Systems,” 1991 (IEEE, 1991)

NFPA 70-1999, “National Electrical Code” (NFPA, 1999)

IEEE Std 80-1986, “IEEE Guide for Safety in Substations Grounding,” 1986 (IEEE, 1986)

IEEE Std 81.2-1991, “IEEE Guide for Measurement of Impedance and Safety Characteristics of Large, Extended, or Interconnected Grounding Systems,” 1991 (IEEE, 1991)

IEEE Std 665-1995, “Guide for Generating Station Grounding,” 1995 (IEEE, 1995)

IEEE Std 1050-1996, “Guide for Instrumentation and Control Equipment Grounding in Generating Stations,” 1996 (IEEE, 1996)

IEEE Std 1100-1992, “Recommended Practice for Powering and Grounding Sensitive Electronic Equipment,” 1992 (IEEE, 1992)