

FRED FRIAR, P.E.

Consulting Engineer

CREDENTIALS

Professional Engineer since 1996, licensed or registered in the following states:

Kentucky | Ohio | West Virginia

*Alabama | California | Florida | Georgia | Illinois | Michigan | Nevada | New Jersey | New York | Oklahoma | Tennessee | Virginia
Arizona | Idaho | Maryland*

Current NCEES record for ease of licensure in additional states.

BSEE, WVU Institute of Technology, 1991.

CAPABILITIES

LOW AND MEDIUM VOLTAGE ELECTRICAL DISTRIBUTION

GENERATOR, UPS, AND INVERTER SYSTEMS

LIGHTING DESIGN AND PHOTOMETRICS

DIMMING, RELAY, AND DMX INTERFACE

COORDINATION, FAULT CURRENT, AND ARC FLASH

COMMISSIONING

LIGHTNING PROTECTION AND SURGE SUPPRESSION

FIRE ALARM SYSTEMS

ASSESSMENT AND FEASIBILITY REPORTS

OFFICE, PLANT, WAREHOUSE, DISTRIBUTION

RETAIL, RESTAURANT, NIGHTCLUB

CASINO, RESORT, HOSPITALITY

AUTOCAD DESIGN AND DRAFTING

PETROCHEMICAL, FUELING, AND HAZARDOUS LOCATIONS

SPECIFICATIONS

PEER REVIEWS

COST ESTIMATES

FEDERAL, STATE, AND LOCAL GOVERNMENT; GSA AND VA

WATER/WASTEWATER PLANTS AND SYSTEMS

RUNWAYS, HANGARS, AND TERMINALS

MILITARY DESIGN-BUILD RFP AND DESIGN

LEED, CALIFORNIA TITLE 24, AND IECC

REPRESENTATIVE PROJECTS

Facilities

World of Beer, National

Complete electric design for a chain casual dining restaurant with multiple locations. Some locations are adaptive reuse of existing buildings. Each location includes kitchen design, and a large walk-in refrigerated area in addition to typical restaurant coolers and freezers.

Hotel Design, National

Complete electric design for Hampton Inn, Comfort Suites, Staybridge Suites, and Springhill Suites; including coordination with corporate reviewers, adherence to chain standards, and adapting to local requirements as required.

Dovetail Solar, National

Provide engineering support for a regional solar contractor for system ranging from a few kW through megawatts of capacity.

The Crossing Baptist Church, Proctorville, OH

A 6600 SF Church in an existing commercial strip center. Tasks included coordination with power company, lighting design, coordination with Church A/V personnel for sound and lighting systems, and design of telecommunications wiring.

American Electric Power Service Building, St. Albans, WV

Addition of a 60kW generator for an existing facility to back up selected loads such that the facility could be utilized to support operations during outages. Tasks included determination of generator size and loads that could be accommodated within a fixed budget, site investigation to create detailed drawings for reconnection of existing circuits to generator backed panelboards, and commissioning services upon completion of installation.

FedEx Ground Distribution Center, Dover, NJ

A 22,000 SF expansion of an existing distribution facility. Site survey, coordination with architect and other engineers, lighting calculations to integrate fluorescent high bay lighting into a facility previously illuminated by HID type lighting fixtures, coordination with local building department, and provision of mechanical and plumbing engineering design services via subcontract.

FedEx Ground Vehicle Maintenance Garage, Albany, NY

A vehicle maintenance building adjacent to an existing distribution facility. Coordination with the architect, other engineers, local utility companies, and the local building department. Coordinated the provision of mechanical and plumbing engineering design services via subcontract.

FedEx Ground Distribution Center, South Point, OH

A 75,000 square foot distribution center. The facility is a high-bay structure with a small office area. Coordination with utility companies and industrial park personnel, interior and exterior lighting design to strict client standards, and power distribution design to accommodate materials handling equipment under a separate contract. Assistance was provided to the general contractor during the bidding phase for subcontractor selection, as well as during construction, and field measurements to verify photometric calculations.

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Industrialized Unit Office Facility, Early Engineering, South Point, OH

Installation of eight modular structures interconnected to serve as a temporary office facility. Coordination with electrical contractor and electric utility company, load computation and creation of design documents, and coordination with State inspectors and plans reviewers to ensure a code-compliant installation.

Emergency Lighting Upgrades, Grand Central Terminal, New York, NY

Project electrical inspection services for the upgrade of the emergency lighting system for train platforms within Grand Central Terminal in Manhattan. Coordination with the electrical engineer of record, vendors, and electrical contractors. Project required licensure as a Professional Engineer in New York, attendance of project meetings, and issuing inspection reports. Project also required development of test procedures for circuit breakers, feeders, and branch circuits.

Photovoltaic System Study, Addabbo Federal Building, Jamaica, NY

Addition of a photovoltaic array to the roof of a large GSA office building. Coordination with building engineer and photovoltaic consultants to maximize the size of the array, determine of a point of connection to the system to the building's electrical system, and conduct initial cost and payback studies for various scenarios.

Repair Corrosion Control Hangar, Stewart Air National Guard Base, New York Air National Guard, Newburgh, NY

Repairs and upgrades to a corrosion control hangar. Upgrade of lighting for general office and restroom areas, an emergency inverter system, and upgrade of electrical distribution system to accommodate a high expansion foam fire suppression system.

Quiznos Restaurant, Valdosta, GA

Commercial restaurant. Coordination with project architect for customization of prototype documents to ensure compliance with local building and energy codes.

Northern California Casino Expansion

A planned \$350 million casino resort expansion including a site infrastructure upgrade to an existing 21kV customer owned distribution loop. Infrastructure upgrade components include upgrading medium voltage circuit capacity from 400 Amps to 600 Amps, upgrading several SF-6 interrupter switches to accommodate growth via additional outputs, and design of a standby generator plant consisting of eight 2000kW generators operating at 4160V, 21kV paralleling switchgear, and interface with utility point of connection and site SCADA system for automatic transfer and load shedding/soft starting of system on generator power. Site loads include casino, hotel, parking structures, golf course facilities, water and wastewater facilities, a 250kW solar farm, and 750kW of natural gas fired fuel cell units. Project also includes a 2000kW emergency generator for life safety loads, and associated medium voltage site distribution.

City of Henderson Fleet Maintenance Facility, Henderson, NV

Maintenance facility for city fleet vehicles, including fire trucks and other emergency response vehicles, with standby generator power for selected loads and an on-site fueling station. Project was designed with as many LEED concepts as achievable, including dark-sky compliant site lighting with minimal light trespass, minimal energy consumption for indoor lighting, and daylight harvesting for interior lighting.

Brand Steakhouse, Las Vegas, NV

A high-end steakhouse within the Monte Carlo Resort. Complex lighting system in multilevel ceiling, with DMX controlled lighting system, power for A/V and security, and a relocation of a 2500 Amp feed involving temporary generator connection.

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Christian Audigier Nightclub, Las Vegas, NV

Remodel of the existing Tangerine Nightclub within the Treasure Island Resort. Project specific requirements including being required to value-engineer a new state of the art lighting control system down to a system with the same capabilities involving multiple existing dimmer racks and control systems. Project also included power for an aquarium with backup power and LED lighting system.

Monte Carlo Hotel and Casino Repairs, Las Vegas, NV

Restoration of damaged electrical systems due to a rooftop fire. Restoration of FAA obstruction lighting, restoration of facade lighting and a large sign, and remodeling hundreds of guest rooms damaged by smoke and water. Restoration was conducted on a fast-track basis with special attention to coordination with the local authority to ensure all facets of the project were brought into compliance with current codes.

MGM Marquis Ballroom, Las Vegas, NV

A 100,000 square foot facility to be utilized for conventions and live entertainment. Connection to existing 12kV site electrical system, design of a lighting control system, distribution of power throughout a system of floor boxes and show power disconnects, and compliance with IECC and local amendments.

Cherokee Casino, Siloam Springs, OK

A \$90 million casino resort. Coordination with utility companies, coordination with a lighting designer for implementation of lighting control, coordination with owner and a telecommunications consultant for a data center, including power and data distribution for 1500 gaming machines, and a hotel tower. Project included standby and emergency generator power and a 1200kVA flywheel UPS system.

San Diego area Casino Resort

A \$300 million casino resort. Coordination with utility companies, coordination with a lighting designer for implementation of lighting control, coordination with owner and a telecommunications consultant for a data center, including power and data distribution for over 2000 gaming machines, and design of a high rise hotel tower. Standby and emergency generator power operating at 12,470V and UPS backup systems, and design with consideration to California's Title 24 Energy Code. Several alternative energy concepts were researched and presented to the owner for consideration, including solar, wind, and fuel cell concepts for electric power generation; and the utilization of biodiesel fuel for the facility's standby power system.

Pompano Operations Center, FDOT District 8-Turnpike, Broward County, FL

Expansion of an existing Operations Center, including a Traffic Management Center, an Emergency Operations Center, and associated administrative offices. The facility is backed-up by stand-by generator power and is storm hardened for resistance to hurricane damage.

Navy Construction Battalion Center: Post-Katrina Recapitalization, Gulfport, MS:

Design-Build RFP (Request for Proposal) for projects that included classroom facilities, an armory, and a state-of-the-art fitness center. Extensive site investigation and coordination with base personnel for power distribution, voice, and data telecommunications requirements; research of Navy standards to determine requirements; and a telecommunications study to determine voice and data telecommunication requirements for the entire base, designed to BICSI standards and Navy construction standards as well as NMCI (Navy Marine Corps Intranet).

Electrical Power Studies, Ministry of Materials and Industry Headquarters, Baghdad, Iraq

Review of design documents and calculations for electrical systems for the new headquarters building for the Ministry of Materials and Industry, to ensure project which was recently completed was built to code and was adequate to serve the requirements for the facility. A review of design documents and

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calculations was also conducted for a large prison facility. Specialized aspects of these facilities included coordination with other engineers in the field, working with international equipment and standards, and working with a 380/220V 50Hz electrical system.

Electrical Systems Study, Manatee County Government Building, Bradenton, FL

Performed power quality survey of utility, generator, and UPS backup power systems for building which houses 911 and Emergency Operations centers, in response to interruption of critical systems due to a hurricane. Project included recommendations for upgrades to existing systems to improve reliability.

Electrical Systems Study, Air Force Station, Florida Keys

Electrical survey of the power system serving the entire station. Objective was to examine and report existing conditions and codeworthiness of the system, conduct a short circuit analysis of the electrical distribution system, and suggest improvements.

Round Lake Plaza, St. Petersburg, FL

Two retail strip centers. Coordination with architects, city planners, utility companies, and consultation with prospective tenants for special accommodations.

Weiss Research, Jupiter, FL

Electrical engineering analysis of a 168,000 square foot office building for a proposed commercial multi-tenant office building application. Study included recommendation of upgrade of electrical distribution suitable for commercial call center applications.

Toronto Blue Jays Facilities, Dunedin, FL

Expansion of the stadium and training facilities. Survey of existing electrical systems followed by design for necessary upgrades as well as complete new systems to accommodate the expanded facilities. In addition to building's electrical systems, the overall project involved sports lighting in compliance with Major League Baseball standards, and lighting for a new Little League field and associated concession stand.

Lee Nails, Parkside Mall, Pinellas Park, FL

Commercial nail salon, including lighting, power, and electrical associated with advanced ventilation requirements.

Uniform City, Tampa and Clearwater, FL

Medical uniform store, including signage, show window lighting, track lighting for display shelves and racks, and point of sale power and communications.

Tech Data Distribution Center, Miami, FL

A 400,000 square foot warehouse. Design of the building's electrical systems, power distribution, generator, and UPS. Coordination with materials handling consultants.

Rocky Point Harborview, Tampa, FL

An eight story high-rise office building. Design of the building's electrical system, including high-rise specific requirements such as elevators on a group controller incorporating legally required standby generator power. Fire command center, voice evacuation system, and extensive firefighter communication systems throughout the building. Cafeteria and fitness center.

Intermedia Communications, Tampa, FL

A six story office building. Design of the building's electrical and fire alarm systems, including high-rise specific requirements.

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Chase Manhattan, Tampa, FL

A large three building office campus with a parking deck. Design of the building's electrical systems, specialized site lighting, power distribution, extensive UPS and generator facilities, security systems, and a large commercial kitchen and dining area with specialized lighting.

Electrical Engineer, Interstate Commerce Center, Tampa, FL

Two food court restaurants with dining areas, including custom lighting, signage, interface with the mall fire alarm system, and compliance with food code. Food court was associated with the conversion of an enclosed shopping center to an office facility.

First Union Operations Center, Orlando, FL

A 270,000 square foot bank operations center. Design of the building's electrical systems, power distribution, generator, flywheel UPS, and associated security systems.

Planet Hollywood World Headquarters, Orlando, FL

Corporate headquarters building, corporate test kitchen, and warehouse. Design of the building's electrical systems, power distribution, and UPS.

Westshore Mall, Tampa, FL

Peer review of engineering documents for the build-out of tenants for a mall expansion.

Residential

New York City Housing Authority (NYCHA) – Hurricane Sandy Recovery, New York, NY

Ongoing engineering support for the repair and reconfiguration of several public housing buildings such that buildings will have electrical systems resistant to flooding, and provide generator power for the buildings during extended utility outages. Typical design includes relocating existing electrical service equipment to a location above flood plain, and installation of natural gas fired standby generators, with emergency capability for hi-rise buildings.

Boury Lofts, Wheeling, WV

Renovation of an existing six story warehouse building into a residential apartment building. Tasks included lighting and power design and coordination related to preservation of historical aspects of the original building, and planning and coordination the with electrical utility company for subterranean primary distribution and tenant metering.

Life Safety System Upgrades, NYC DHS, New York, NY

Survey existing facilities for the purpose of upgrading fire alarm systems, life safety systems, and standby and emergency generator systems for several homeless residence facilities. Determined requirements to bring systems into compliance with current NYC Building Code, provide power for emergency lighting and other legally required and optional systems including elevators and fire pumps.

The Cloisters Condominium, St. Petersburg, FL

A 14 story high-rise residential project. Design of the building's electrical systems, power distribution, and generator, including elevator group control and high-rise specific fire alarm system. In addition to residential usage, electrical systems included provision for future inclusion of retail elements within the complex.

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Industrial, Water/Wastewater, and Fueling

Harbison Walker International, South Point, OH

A 130,000 square foot manufacturing facility. Design included shell building, including full LED site and interior lighting; electrical service to accommodate packaged manufacturing equipment, and multiple overhead cranes.

Electrical System Study and Recommendations, Waverly, OH

Engineering support for a general engineering consultant to determine if the existing power system for a light commercial manufacturing facility could be adapted to power a new manufacturing unit.

Deliverables included a report, preliminary single line diagram and load calculations, and construction cost estimate.

Commissioning Engineer, LG&E/KU Trimble County Plant, Bedford, KY

Commissioning Engineer for the startup of 6.9kV and 480V equipment associated with a flyash barge loading system. Development of startup procedure, coordinating plant-specific startup requirements with plant personnel, selection of acceptance testing contractors, supervising startup activities, and developing a final commissioning report. Provided technical support for the electrical contractor for construction activities occurring concurrently with startup activities.

Electrical Reliability Engineer, Sunoco Chemicals, Haverhill, OH

Served as Electrical Reliability Engineer on a contract basis in a chemical plant involved in the production of chemical components utilized in the plastics industry. Provided engineering support for a team of maintenance electricians, coordination and review of capital project including development of FEL documentation, and coordination with outside contractors, vendors, and maintenance shops. Planned and supervised the electrical activities of a plant maintenance turnaround, tracked periodic maintenance utilizing TabWare software, created and processed of MOC (management of change) documents, PSM adherence, and assisted in the development of a PPE implementation for arc flash safety. Served as engineer in responsible charge for an arc flash study.

Cooling Tower Analyzer Structure, Braskem SA, Neal, WV

Installation of a packaged analyzer shed for cooling tower water. Created hazardous classification diagrams for an environment containing hydrogen piping and hydrogen storage, routing of power and control wiring along new and existing pipe racks, conduit, and cable tray systems, and expansion of an existing fire alarm system to include the analyzer structure.

Power System Study, AK Steel, Ashland, KY

Power system study for a large steel production facility. Modeled the system in ETAP software, conducted field visits to investigate existing equipment parameters and to confirm the accuracy of as-built documents provided by the plant, and assisted plant personnel in the purchase and utilization of ETAP software.

Tank Farm Expansion, Ashland Inc., Louisville, KY

Relocation of multiple large vertical solvent storage tanks. Design and specifications for a grounding systems in accordance with client standards, and field coordination with construction personnel to properly install and connect system to existing grounding systems and test for specified resistance.

Water Filtration Facility Enclosure, SunCoke Energy, Haverhill, OH

A structure to provide freeze protection for two large Zenon water filtration units. Lighting and power design, grounding system design, and design for the expansion of existing fire alarm and lightning

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protection systems. Additional tasks included Signed and sealed drawings for submission to the State for plans review and associated permit application.

New Fuel Terminal, Juan Santamaria International Airport, San Jose, Costa Rica

Project Electrical Consultant for an expansion of the fueling system to support an airport terminal expansion. Four 12m diameter above-ground tanks, four 150HP pumps, extensive instrumentation, control, and EFSO systems; and fueling hydrant pits at gates to facilitate aircraft refueling. Continual review and ongoing support of the design of a local consulting engineering firm, providing guidance for hazardous area classification documentation, and code compliance including NFPA 30A, 407, and 70, especially 500 series articles. The client is the national refinery, and mandated further that API guidelines be utilized with respect to the electrical design, especially in the determination of hazardous classification and recommended lighting levels. Project required licensure as a professional engineer in Costa Rica.

Camp Lemonier Electric Power Plant, US Navy NAVFAC, Djibouti, Africa

Fuel storage facility for a new electric prime power plant. Electrical distribution for packaged load and unload systems and transfer pump system, in Class I Division 1 and 2 hazardous environments. Area lighting designed to API standards, grounding and lightning protection systems, Pneumercator TMS3000 for inventory control, design of EPSO systems, and adherence to metric standards.

Fueling System, United States Army, Ft. Benning, GA

New fueling facility was installed to dispense JP-8, Diesel Fuel and Gasoline. Above ground tanks with submersible pumps, four fuel dispensers with telemetry to inventory and level control systems, two load racks configured for bottom loading, and design for Class I Division 1 and 2 environments.

Load Rack Conversion, United States Army, Ft. McCoy, WI

A load rack for JP-8 fuel was converted from a top load configuration to a bottom load configuration. Field investigation to determine adequate capacity for additional start, stop, and metering controls, creation of hazardous classification diagrams, and coordination with a FuelMaster system vendor for

Proctor & Gamble Hanger Fueling System at Lunken Field, Cincinnati, OH

Installation of a packaged reel-type fueling system for a fleet of corporate aircraft. Electrical design in Class I Division 1 and 2 environments to support pumps and inventory control with a Pneumercator TMS3000 system, site lighting to API and IESNA standards, and interface with an existing hangar. incorporation into modified design.

Lehigh Acres Wastewater Treatment Plant Expansion, Leigh Acres, FL

Expansion of wastewater plant, including new electrical service and motor control center, and interface with existing plant control system. New standby diesel generator for backup of entire plant.

Manatee County Wastewater Treatment Plant Upgrades, Bradenton, FL

Three new 350HP pumps and Variable Frequency Drives, and an additional standby generator for the reclaimed water system. 4160V generator and substations and network-based control system.

Majestic Golf Reclaimed Water Storage, FL

Modification of golf course irrigation system, including remote radio control of motorized valve for control of storage of reclaimed water for irrigation.

Manatee County Water Analysis Laboratory, FL

An 8,000-square-foot facility. Design of the building's electrical systems, laboratory ventilation system, power distribution, standby generator, and UPS.

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Lockheed Martin, Pinellas Park, FL

A 200,000-square-foot manufacturing facility. Design of the building's electrical systems as well as overhead power distribution via horizontal bus ducts to serve large equipment associated with the manufacture of aircraft parts.

Healthcare

O'Bleness Hospital, Athens, OH

Multiple projects; including general medical office and exam area reconfiguration, Nuclear Medicine equipment installation, and MRI Suites.

Dublin Dental Clinic, Dublin, OH

A 16 chair dental clinic. Design included a standby generator such that 50% of the facility could be utilized during utility power outages.

Holzer Wellness Center, Gallipolis, OH

A community wellness center for a regional hospital. Facility was an adaptive reuse of an existing grocery store, and included a fitness center with indoor track, therapy pool, and LED site and indoor lighting.

Cath Lab – Bellevue Hospital Center, New York, NY

Upgrade of a cardiac cath lab to a GE Innova system. Tasks included coordination with hospital personnel to upgrade existing generator distribution system to accommodate the upgrade and feed an existing cath lab, coordination with GE for hospital infrastructure and cabling requirements, and lighting design.

Upgrade of Emergency Electrical Systems, James J. Peters VA Medical Center, Bronx, NY

Upgrade of generator and emergency systems for a hospital campus. Brought an existing system into code compliance; specifically NFPA 70, 72, 99, 110, and VA Electrical Design standards for life safety, critical equipment, and essential equipment applications in Type 1, 2, and 3 hospital environments. Upgrades included multiple paralleled generators and automatic transfer switches, and design of new electrical distribution panelboards to segregate existing loads into life safety, critical equipment, and essential equipment branches.

Replacement of Site Lighting, Lyons VA Campus, Lyons, NJ

Upgrade of outdoor lighting for a large hospital campus. Lighting included roadway lighting, parking area lighting, pedestrian area lighting, and upgrade of egress discharge lighting to mitigate dark areas for security. Luminaires were selected to complement the historical nature of the site, followed by approval of VA architectural personnel. Payback and photometric studies for the utilization of LED light sources, followed by specification of LED lighting in compliance with ARRA.

University of Florida Orthopaedic Surgery & Sports Medicine Institute, Gainesville, FL

A LEED compliant \$24.8-million four story facility for teaching, research, and clinical care. Coordination of requirements from numerous user groups. Design of nurse call and fire alarm systems, and a large radiology suite. Primary power distribution at 12.47kV on overhead lines and underground in duct banks.

Miscellaneous Infrastructure

St. Petersburg-Clearwater International Airport Runway Extension, FL

A 930-foot extension of Runway 17L / 35R (primary runway) from 8,800 to 9,730 feet including taxiway extension, RSAs, blast pads, lighting, displaced landing thresholds, construction in Old Tampa Bay, and relocation of airport-owned golf course structures adjacent to the runway extension. Constant current regulators for runway lighting, upgraded diesel generator for operation of all runways and taxiways in the

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event of a power failure, coordination with FAA regarding airfield lighting systems, and design of a radio-controlled system for controlling runway lighting from aircraft. Also designed the electrical system for the golf cart storage, maintenance, and charging facility at the adjacent golf course.

Southwest Florida International Airport Airfield Lighting, Ft. Myers, FL

Relocation of airfield lighting associated with the relocation of a runway and a taxiway. Addition of constant current regulators for airfield lighting, design of standby generator system to provide backup power for lighting, and design of interface for airfield lighting control system for remote control for new regulators.

FEMA Inspection, Orlando International Airport, Orlando, FL

Electrical inspection of hurricane damage for the Greater Orlando Aviation Authority's damage claim report to FEMA. Duties included observation of damage and description of the scope and cost of the required repair.

SR 408 / SR 400 (I-4) Interchange, Orlando, FL

Lighting and associated power distribution system for the interchange, which involved 154 conventional roadway lighting poles, 22 under-deck, and 55 pedestrian fixtures. Conventional lighting systems were utilized on the mainlines, feeder roads, and ramps, while compact fluorescent and HPS were utilized for pedestrian and under-deck areas. The roadway lighting system photometric performance was designed in accordance with Florida Department of Transportation design standards. Lighting software was utilized extensively to facilitate design of the lighting systems and to document the projected photometric performance.