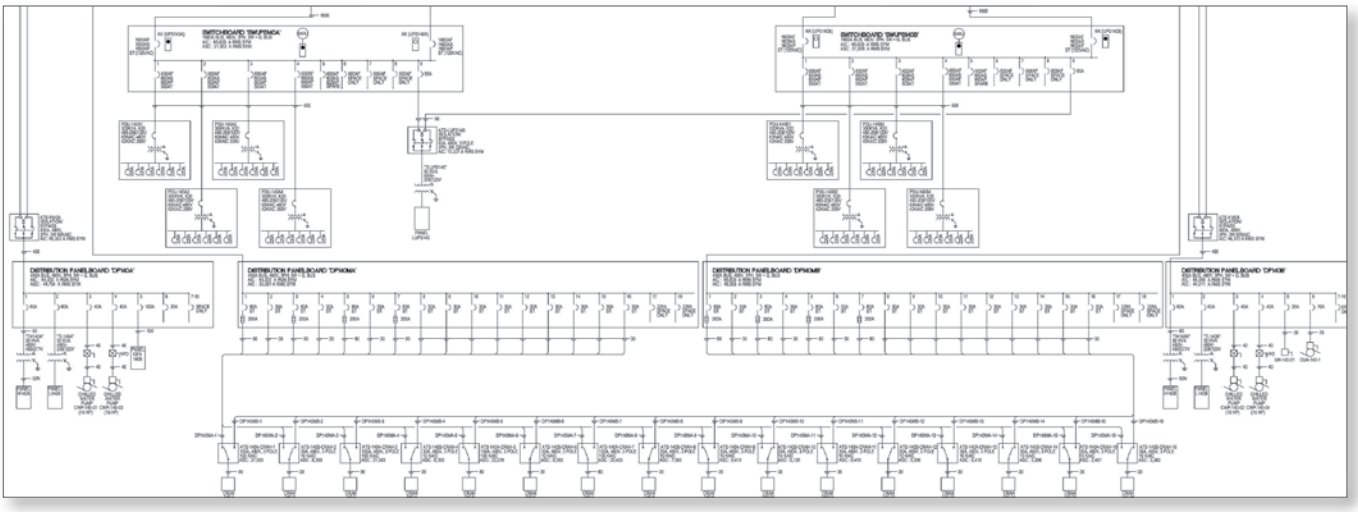
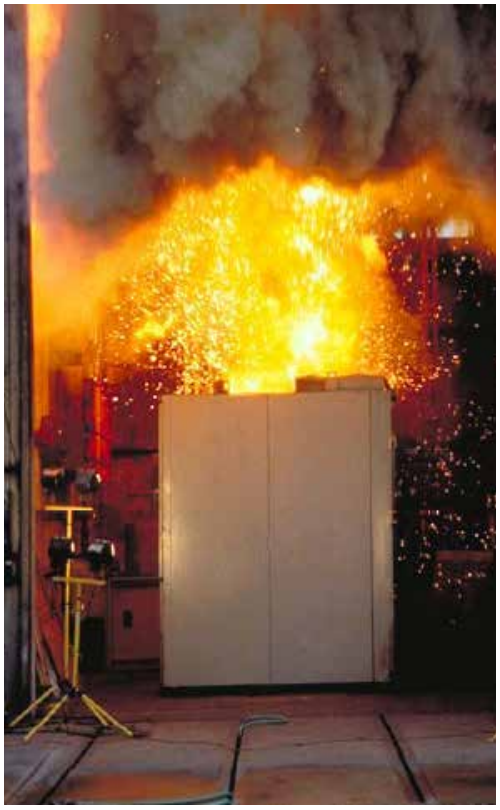


JJA *Mechanical and Electrical Engineering Consultants*

Engineering Since 1978

POWER STUDIES



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Texas Registered Engineering Firm # F-1290

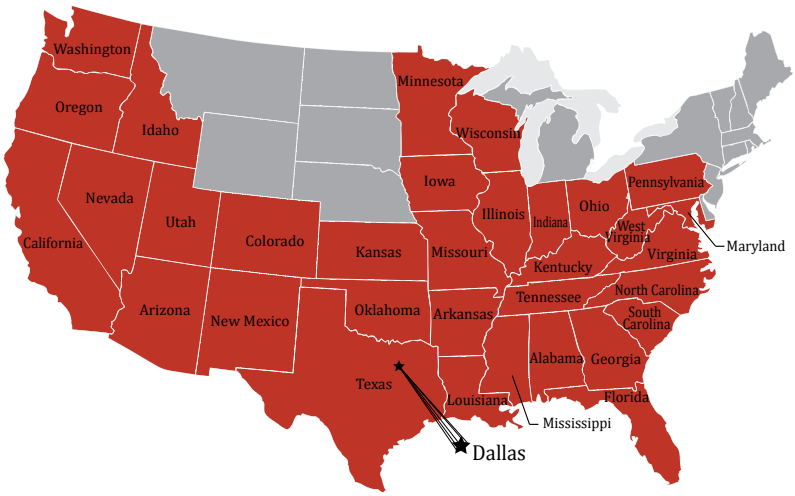
JJA, Inc.
Company Profile

JJA, Inc. is a leading Mechanical and Electrical Engineering Consulting firm established in 1978 in Dallas, Texas providing engineering design of HVAC, Plumbing Fire Suppression, Electrical Distribution and Critical Power Systems, Lighting systems, Life Safety systems, Sustainable Designs, Energy Modeling and MEP System Commissioning.

JJA holds Professional Engineering registrations in over 30 states, providing services locally, regionally, and nationally. JJA also performs national on-call MEP services for several corporate Clients.

JJA is committed to sustainable design solutions, utilizing innovative engineering design processes that focus on the life cycle performance for MEP Systems.

JJA is dedicated to servicing our clients with integrity and responsiveness, while providing a collaborative TEAM solution.



Market Services
Power Systems MEP Engineering




JJA is a leading consulting engineering firm established in 1978 in Dallas, Texas, and has been providing power system analysis since our inception with an emphasis added to ArcFlash Hazard Assessments in 2003. We have standardized on the use of EasyPower® software, developed by ESA, Inc. located in Portland, Oregon. The analysis is based on the NFPA-70E and IEEE-1584 standards, which require a detailed model be developed for the electrical distribution system.

JJA has performed Power System Studies for mission critical facilities, commercial office buildings, corporate campuses, industrial, manufacturing, and corporate campus projects. Power System Analysis performed by JJA includes an overview of the electrical distribution system using three (3) separate but integrated steps. Each step of the study; the Short Circuit Study, the Coordination Study and the Arc Flash Study, work together to determine potential concerns and possible methods of improving the selective coordination of the electrical distribution system and provides labeling compliance with permanent labeling of the equipment per NFPA 70E and OSHA.

JJA is committed to providing a safe working environment for our Clients by providing a complete electrical distribution system power study.

Power Systems Services

Power System Study

Short Circuit Study

Coordination Study

Arc Flash Study

Power Study Clients - Partial Listing

AT&T
Bank of America
BNSF Railway
Capital Group
Chase
Digital Realty Trust
Federal Home Loan Bank
Flextronics
Holman Boiler
Hunt Oil
Nortel
Rackspace
UUNet
ViaWest

JJA, Inc.

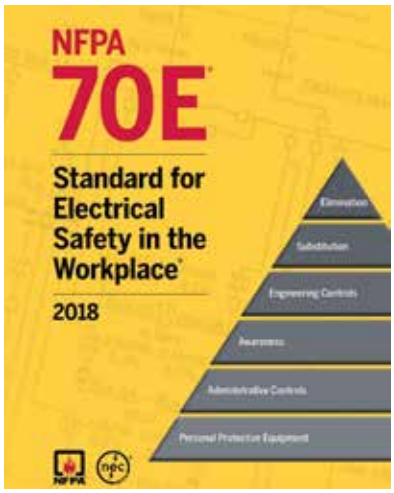
Power Systems - At a Glance

Engineering Design = Understanding Performance

JJA is extremely qualified to perform power system design and analysis on a variety of electrical distribution system types, system complexity, and size. With our strong roots in the engineering design of electrical distribution system, and focus on mission critical applications, we understand electrical infrastructure configurations, modes of operations, and how system should perform or operate under normal, emergency, and fault conditions.

EasyPower = Industry Partnership

In 1998 JJA standardized on EasyPower, as developed by EAS, Inc, as our Window's based computer analytical software to be used for our power system analysis. The software is based on IEEE 1584 and NFPA-70E requirements and provides excellent resources and formatted output. Our partnership with ESA, Inc. includes their involvement in code committees at both IEEE & NFPA, continual software updates as standards are modified, technical support and intensive training of JJA personnel. ESA, Inc. offers "Safety Tracker" software that allows end users to develop energized work permits based on NFPA-70E using the calculated arc flash energy for all the various operating modes presented in our reports.

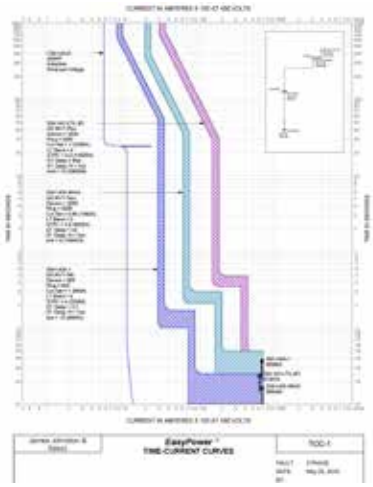


Power System Study

A Power System Study is used to provide a complete overview of the electrical distribution system using three (3) separate but integrated steps. Each step of the study; the Short Circuit Study, the Coordination Study and the Arc Flash Study, work together to determine potential concerns and possible methods of improving the selective coordination of the electrical distribution system and provides labeling compliance with permanent labeling of the equipment per NFPA and OSHA.

Short Circuit Study

The Short Circuit Study is used to determine if all electrical components of the distribution system are rated properly for the anticipated fault currents. Multiple operational scenarios are considered in the Short Circuit Study to validate the worse case conditions. NEC 110.9 and NFPA 70E both require that the rating of the equipment be sufficient for interrupting the maximum available fault current and that the equipment be able to withstand or interrupt the fault currents at the point of use.

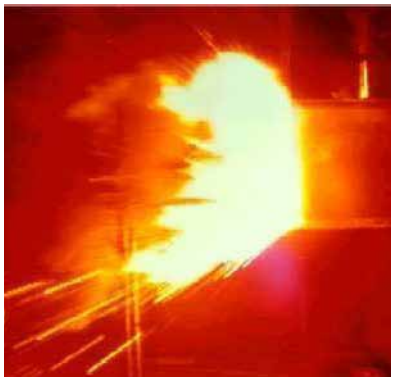


Coordination Study

The Coordination Study is used to illustrate and document the circuit breaker settings throughout the electrical distribution system. The Coordination Study will determine the time and current values at which a circuit breaker should trip. This part of the study will determine the order in which circuit breakers trip and evaluates the selective coordination of the circuit breakers. Circuit breaker trip settings are an important part in generating the results of the arc flash study, since the time it takes to trip a circuit breaker affects the time an arc will be sustained and ultimately determines the arc flash hazard.

Arc Flash Study

An arc flash is an electrical discharge that uses the air as a conductor, due to a fault between a phase bus bar and another phase bus bar, neutral or ground.



The massive energy discharge from an arc flash event will cause metal to vaporize and thus causing an explosive volumetric increase in pressure conservatively estimated as an expansion of 40,000 to 1. The metal of buss bars and conductor can often be melted or even vaporized, leading to explosively hot gas and molten metal being dispersed through the air. This could result in serious injury, property damage or even death. This is why it is important to have properly selected over-current protective devices and a proper coordination between these devices to handle the arc fault conditions. In addition to the calculation, guidance to the required level of Personnel Protective Equipment (PPE) is provided and documented with the use of OSHA warning labels.

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