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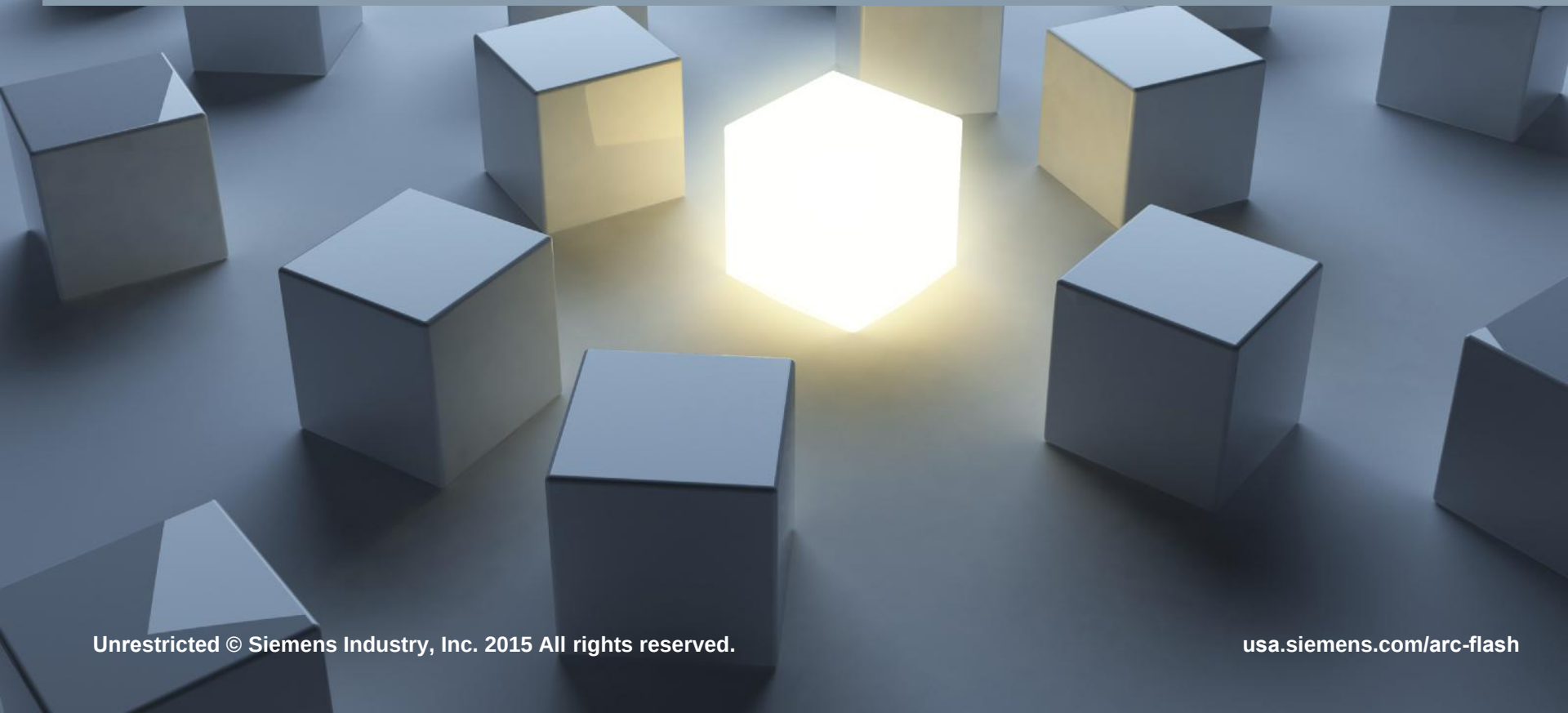
Arc Flash Mitigation Solutions:

A Proactive Approach To Arc Flash Risk



"Everyone is concerned about the risk of Arc Flash , But they never imagine an incident happening at their facility."

Statistics to Remember

30,000 arc-flash events

7,000 burn injuries

Arc-flash incidents hospitalize **5-7** workers in North America every day

Of those **7,000** burn injuries, more than **2,000** people enter burn centers with severe arc-flash burns

About **300** of these cases result in death

Are These Challenges You Face?

- ✓ Employee Safety
- ✓ Systems Life Cycle
- ✓ Energy Costs
- ✓ Proper Protection Equipment
- ✓ Regulation Compliance
- ✓ NFPA 70E Safety Training
- ✓ Uptime
- ✓ Preventative Maintenance
- ✓ Predictive Maintenance
- ✓ Replacement Costs
- ✓ Budget Constraints
- ✓ Systems Reliability and Safety
- ✓ Arc Flash Hazard Risk
- ✓ Labor Costs

What is an Arc Flash?

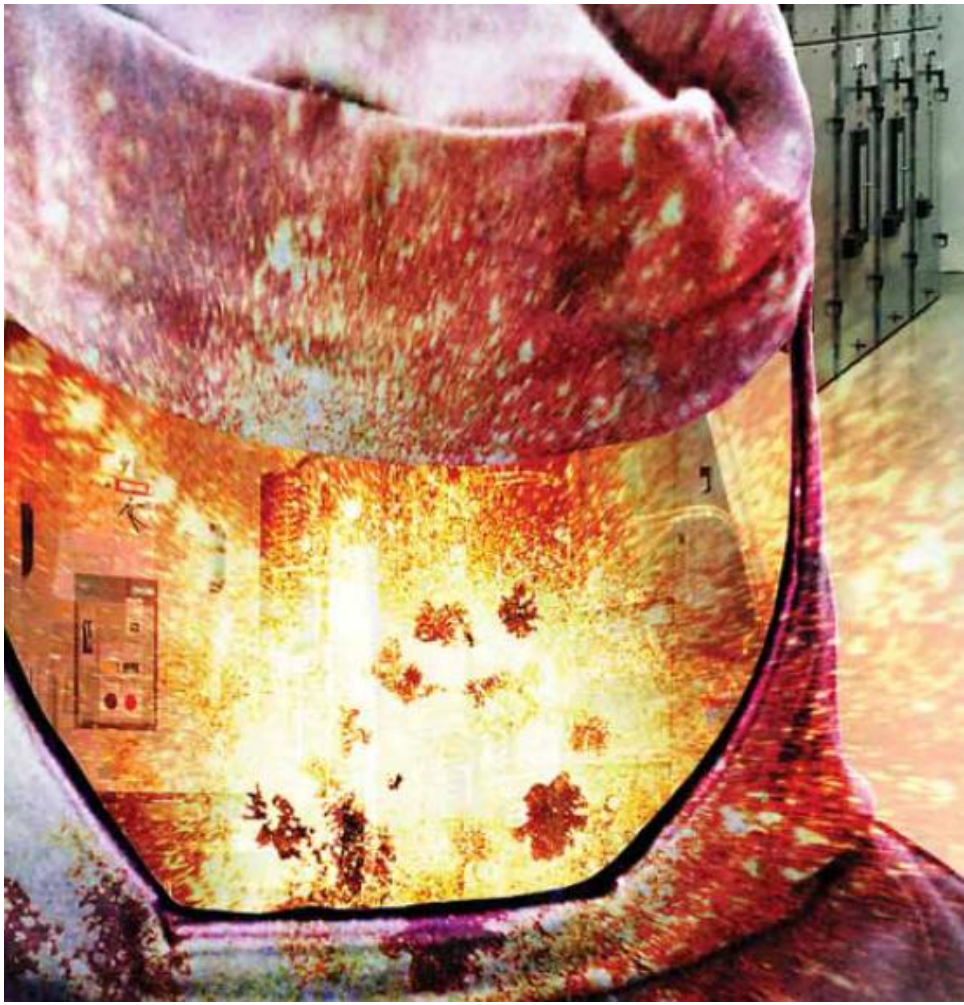
An arc flash is when a flashover of electric current leaves its intended path and travels through the air to another nearby conductor or ground

It can result in

- Serious injury and death
- Lawsuits and liability
- Destruction of essential equipment
- Facility downtime

An arc flash can produce several hazards

- **Heat** in excess of **35,000˚F**
- **Pressure** blast of about **300 lb/ft^2**
- A **loud** explosion approximately **160 db**
- **Projectiles** and shrapnel from equipment flying at speeds approximately **700 mph**



Why is Arc Flash Mitigation Important?

- Dense power infrastructures with **high levels of potential energy**, such as those found in data centers and electrical substations, present prime conditions for arc flash
- **OSHA**, has become more active and strict in applying its rules on arc flash prevention and safe maintenance*
- **NFPA**, has issued clear guidelines on avoiding risks associated with arc flash – more stringent over past 3 years

* 451 Research: Electrical Storm in the datacenter: arc flash concerns prompt upgrades, process change

Summary of the Siemens Arc Flash Mitigation Solution

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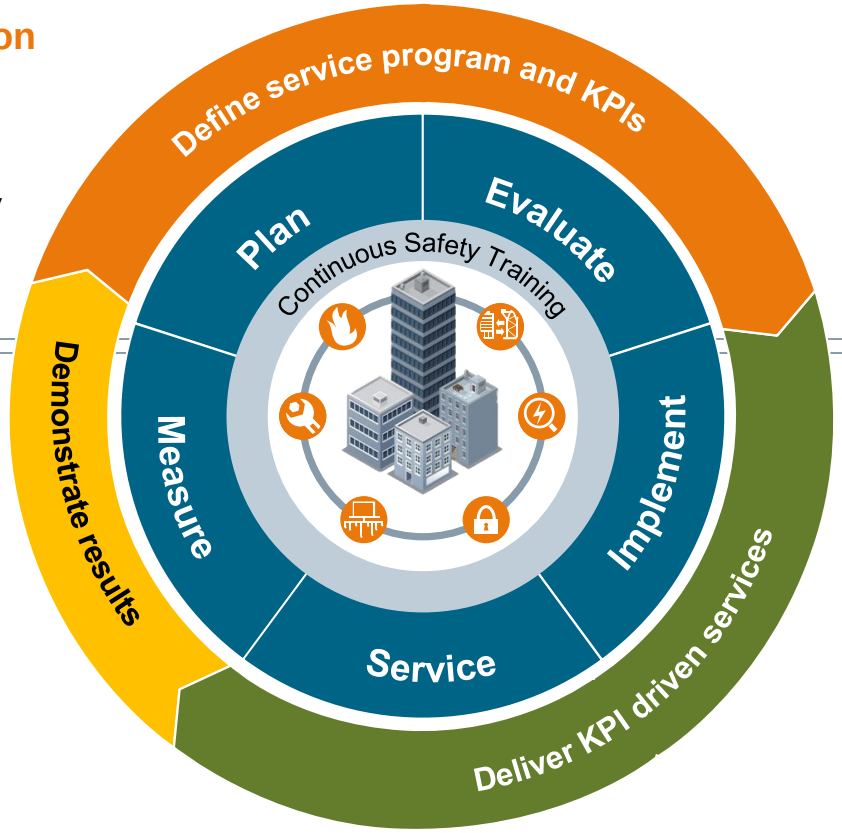
Arc Flash Consultation

- Outcomes & KPIs
- Training paths to secure tenant safety & system efficiency

Arc Flash Study

- Power systems study
- Resource gap analysis
- Arc Flash recommendations



Measure results

- Performance & execution reporting
- Quality assurance meetings

Arc Flash Mitigation

- Program setup
- Arc Flash Mitigation Solutions & Service
- Modernizations
- Upgrades
- NFPA 70E compliant
- One-time services

Preventative Maintenance

- Arc Flash Protection Based Maintenance Agreement

What Does This Service Look Like?

1. Consultation
2. Analysis
3. Modernization & Improvements
4. Preventative Maintenance
5. Measurement

What Does This Service Look Like?

1 Consultation

- Identify desired outcomes and set program goals
- Define key performance metrics
- Establish training plan to secure tenant safety and system efficiency

What Does This Service Look Like?

2 Analysis

- Complete arc flash hazard analysis
- Conduct resource gap analysis
- Deliver arc flash program recommendations

What Does This Service Look Like?

3 Modernization & Improvements – Siemens CPR Mitigation Approach

- Set-up of arc flash program
- Provide arc flash mitigation solutions and service
- Complete modernizations and upgrades
- Ensure NFPA 70E compliance
- Conduct one-time services

We Practice CPR

3 Modernization & Improvements

C Contain

- Implementation of arc resistant switchgear/MCC

P Prevent

Prevent Arc Flash Incidents

- Remote Monitoring for temperature, metering and maintenance data
- High resistance grounding
- Insulated Bus
- Siemens GIS
- Work De-energized
- Replace over duty device

Protecting Personnel

- Remote operation
- NFPA 70E/ Electrical Safety Training
- Siemens remote racking devices
- Siemens Labeling

R Reduce

- Dynamic breaker parameter changes to reduce arc fault levels (Maintenance Switch)
- Adjust protective device settings
- Add/Replace Circuit protective device
- Add Virtual Main
- Arc Flash Light detection relays
- Add Bus Differential relay
- Insulated Bus
- Three phase fault making device

What Does This Service Look Like?

4 Preventative Maintenance

- Define preventive maintenance program
- Perform preventive maintenance services
- Service Agreement

What Does This Service Look Like?

5 Measurement

- Monitor performance execution
- Deliver reporting on key performance metrics
- Hold regular quality assurance meetings

On-call service professionals that know your equipment

Through our network of over 100 service locations across the country we can respond quickly and efficiently to any emergency. Our local electrical field service personnel and operational support staff are:

- On call 24/7 to respond immediately to any emergency and get your critical power equipment back online
- Fully trained and certified specialists to safely and efficiently maintain power distribution and emergency systems
- Knowledgeable of all power distribution equipment and key standards like IEEE, ANSI, OSHA and NFPA70E
- Preventative Maintenance plan that allows you to tailor a service agreement that suits the need of your facility while operating within your maintenance budget

Arc Flash Hazard Analysis

OSHA NFPA70E requires that an Arc Flash Hazard Analysis be performed prior to working on or near electrical equipment containing exposed energized conductors

An Arc Flash Hazard Study helps you:

- Improve employee safety
- Enhance your electrical system safety and efficiency
- Supply safety information to subcontractors
- Assist in compliance in regulations
- Provide documentation for lowered insurance rates
- Provide documentation for workers

Arc Flash Hazard Analysis Includes

1) Short Circuit Calculations
2) Protective Device Coordination
3) Arc Flash Hazard Calculations
4) Documentation
5) Unsafe Work Locations
6) Arc Flash Hazard Mitigation
7) Arc Flash Hazard Labels

5 Benefits of Preventative Maintenance

A preventive maintenance agreement is tailored to your facility's needs. Our service professionals perform on going preventive maintenance to keep safety and efficiency at the highest levels

1) Limits Risk of Downtime
2) Extends Equipment Life Cycle
3) Regulatory Compliance
4) Increases Safety
5) Reduces Operating Costs

Arc Flash Mitigation Solutions Summary

- **Protecting your personnel from dangerous, and potentially fatal, arc flash-related injuries due to improperly maintained equipment or inadequate safety training**
- **Ensuring compliance with the latest regulations and codes, including NFPA 70E, and avoidance of OSHA penalties and fines**
- **Maximizing the reliability of your critical electrical systems and avoiding outages and costly downtime for your organization**
- **Improving the efficiency and lifecycle of electrical equipment and reducing associated energy costs**

