

NFPA 70E

Electrical Safety in the Workplace



NFPA-70E 2015 - Major Revisions

Presented by:
Robert E. Fuhr, P.E.

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Special Thanks to

e-Hazard

- Electrical Safety Training Materials
 - Low Voltage Classes
 - High Voltage Classes
 - Refresher Classes

NFPA 70E

Electrical Safety in the Workplace



**What is 70E
and why do we
need it?**



What are the Electrical Hazards?

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Arc Flash

Electric Shock

Common conditions that may increase hazard:

- Elevated location
- Confined space



Arc blast

Fire ignition

Possible Results

Direct

- Electrocution
- Internal/External Burns

Indirect

- Falls
- Smoke Inhalation

By the Numbers

6

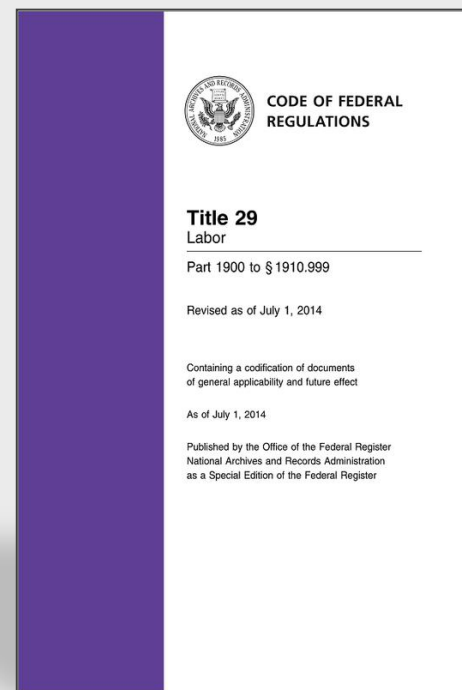
Annually, U.S. averages	4,000	<u>non-disabling</u> electrical contact injuries
Annually, U.S. averages	3,600	<u>disabling</u> electrical contact injuries
Every other day	1	person is electrocuted in the workplace
Electrocutions are	5th	leading cause of traumatic occupational fatalities
Each year	+2,000	workers are sent to burn centers with electrical burns

OSHA Regulations - General

The Code of Federal Regulations (CFR) 1910, Subpart S is the electrical safety regulations for industry.

CFR 1910, Subpart R regulates electrical safety for power generation, transmission & distribution.

- Enforceable as law
- Performance-based language
- Contains the “what,” not the “how”
- Not updated on a regular basis



State of Washington

- OSHA has jurisdiction at
 - DOD Facilities, Tribal Lands, and Marine Installations
- Washington State Plan is administered by the Department of Labor and Industries (DL&I)
- Division of Occupational Safety and Health (DOSH).
- Main office location is located in Tumwater, Washington.

NEC vs. 70E

Normal Conditions

NEC reduces the risk for shock under normal conditions

- When equipment is operated under normal conditions, worker is not exposed to energized parts



Abnormal Conditions

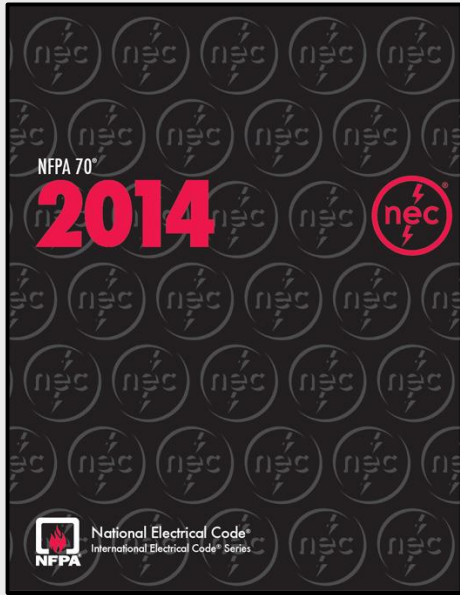
Risk for shock & arc flash increase under abnormal conditions

- NFPA 70E reduces risk through safe work practices

NFPA Approach to Electrical Safety

10

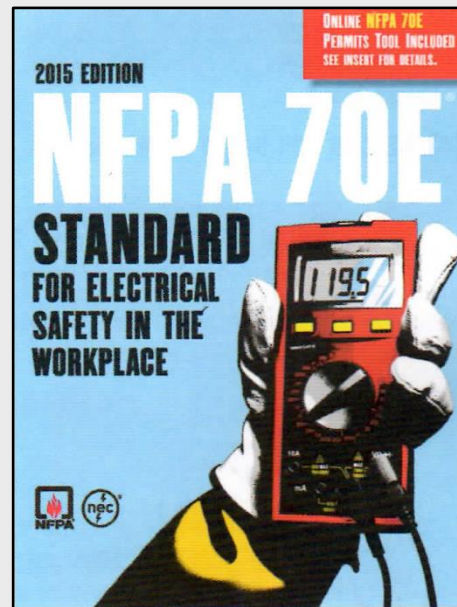
How to...



BUILD it safely

Upgrade/replace
latest NEC applies

Maintain/repair
latest 70E applies



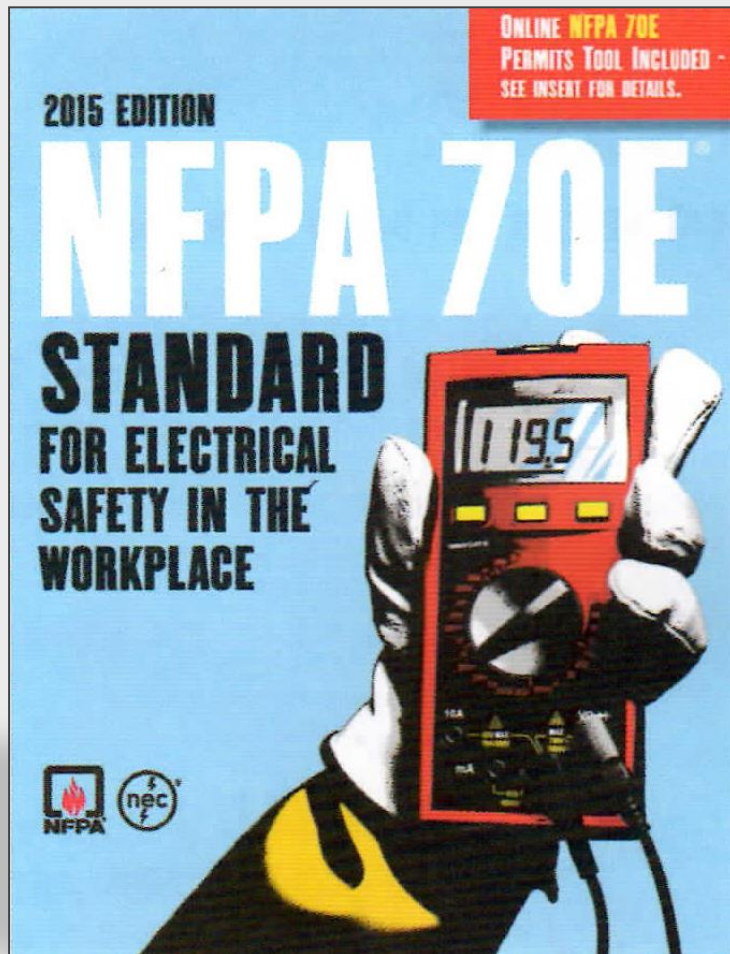
WORK on it safely



MAINTAIN it properly

Strategies in NFPA 70E

11



- Electrically safe work condition
- Training
- Planning
- Hazard Risk Assessment
- Engineering
- PPE & Tools

NFPA 70E

Electrical Safety in the Workplace



2015 Changes

Additions and Revisions in NFPA 70E

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Just like the NEC 70.....

All changes are highlighted

Global Changes

14

- *Arc flash hazard analysis now **Arc flash risk assessment***
- *Electrical hazard analysis now **Electrical hazard risk assessment***
- *Harm now **injury or damage to health***
- *Hazard identification and risk assessment now **Risk assessment***
- *Hazard Risk Category (HRC) now **Arc Flash PPE Category***
- *Probability now **Likelihood***
- *Shock hazard analysis now **Shock risk assessment***

Global Changes

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- *Workshoes now **Footwear***

Article 100 - Definitions

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- **Risk (New Definition)** A combination of the likelihood of occurrence of injury or damage to health and the severity of injury or damage to health that results from a hazard
- **Risk Assessment (New Definition)** An overall process that identifies hazards, estimates the potential severity of injury or damage to health, estimates the likelihood of occurrence of injury or damage to health and determines if protective measures are required.
 - Informational Note: As used in this standard, arc flash risk assessment and shock risk assessment are types of risk assessments.

Article 100 - Definitions

- **Prohibited Approach Shock Boundary** has been eliminated.
 - Only Limited and Restricted boundaries Remain

Simplified Shock Boundaries

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Prohibited Approach Boundary

Energized Work Boundary

Eliminated
in 2015

Restricted Approach Boundary

*PPE & Qualified ONLY boundary –
Requires EEWP*

Limited Approach Boundary

*Qualified Control Boundary –
Prohibits unqualified persons
without escort by qualified*

480 VAC Energized Source



NFPA 70E 130.4

Low Voltage Shock Boundaries

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Nominal Voltage	Shock Boundaries		
	Limited		Restricted
	<i>Exposed... Movable Conductor</i>	<i>Fixed Circuit Part</i>	
AC			
<50 V	Not specified	Not specified	Not specified
50 – 150 V	3.0 m (10')	1.0 m (3' 6")	Avoid Contact
151 – 750 V	3.0 m (10')	1.0 m (3' 6")	0.3 m (12")

OSHA LV
Cutoff
600 V AC

Article 100 - General Requirements for Electrical Safety-Related Work Practices

- **110.1(B) Maintenance**
 - The electrical safety program shall include elements that consider condition of maintenance of electrical equipment and systems.
- **110.3 Relationships with Contractors (Outside Service Personnel, and So Forth).**
 - (C) Documentation. Where the host employer has knowledge of hazards covered by this standard that are related to the contract employer's work, there shall be a documented meeting between the host employer and the contract employer.

Article 130 - Work Involving Electrical Hazards

- **130.2(A) Energized Work**
 - **(4) Normal Operation.** (New Item) Normal operation of electric equipment shall be permitted where all of the following conditions are satisfied:
 1. The equipment is properly installed
 2. The equipment is properly maintained
 3. The equipment doors are closed and secured
 4. All equipment covers are in place and secured
 5. There is no evidence of impending failure

Article 130 - Work Involving Electrical Hazards

- **130.2(A) Energized Work**

Informational Note: The phrase properly installed means that the equipment is installed in accordance with the applicable industry codes and standards and the manufacturer's recommendations. The phrase properly maintained means that the equipment has been maintained in accordance with the manufacturer's recommendations and applicable industry codes and standards. The phrase evidence of impending failure means that there is evidence such as arcing, overheating, loose or bound equipment parts, visible damage, or deterioration.

Article 130 - Work Involving Electrical Hazards

- **130.2(B) Energized Electrical Work Permit**
- **(1) When Required.** When energized work is permitted in accordance with 130.2(A), an energized electrical work permit shall be required under the following conditions:
 - (1) When work is performed within the restricted approach boundary
 - (2) When the employee interacts with the equipment when conductors or circuit parts are not exposed but an increased likelihood of injury from an exposure to an arc flash hazard exists

Article 130 - Work Involving Electrical Hazards

- **130.5 Arc Flash Risk Assessment**
- An arc flash risk assessment shall be performed and shall:
 - (1) Determine if an arc flash hazard exists. If an arc flash hazard exists, the risk assessment shall determine:
 - a) Appropriate safety-related work practices
 - b) The arc flash boundary
 - c) The PPE to be used within the arc flash boundary

Article 130 - Work Involving Electrical Hazards

- **130.5 Arc Flash Risk Assessment**
- Informational Note No. 1:
 - Improper or inadequate maintenance can result in increased opening time of the overcurrent protective device, thus increasing the incident energy. Where equipment is not properly installed or maintained, PPE selection based on incident energy analysis or the PPE category method may not provide adequate protection from arc flash hazards.

Article 130 - Work Involving Electrical Hazards

- **130.5 (D) Equipment Labeling**
- The owner of the electrical equipment shall be responsible for the documentation, installation, and maintenance for the field-marked label.

What Equipment Must be Labeled?

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- Switchboards
- Panelboards
- Industrial Control Panels
- Meter Socket Enclosures
- Motor Control Centers

electrical equipment... “likely to require examination, adjustment, servicing or maintenance while energized shall be field marked with a label...”

Article 130 - Work Involving Electrical Hazards

- **130.6(H) Clear Spaces.**
 - Working space in front of electrical equipment required by other codes and standards shall not be used for storage. This space shall be kept clear to permit safe operation and maintenance of electrical equipment.

Storing Materials in Front of Equipment

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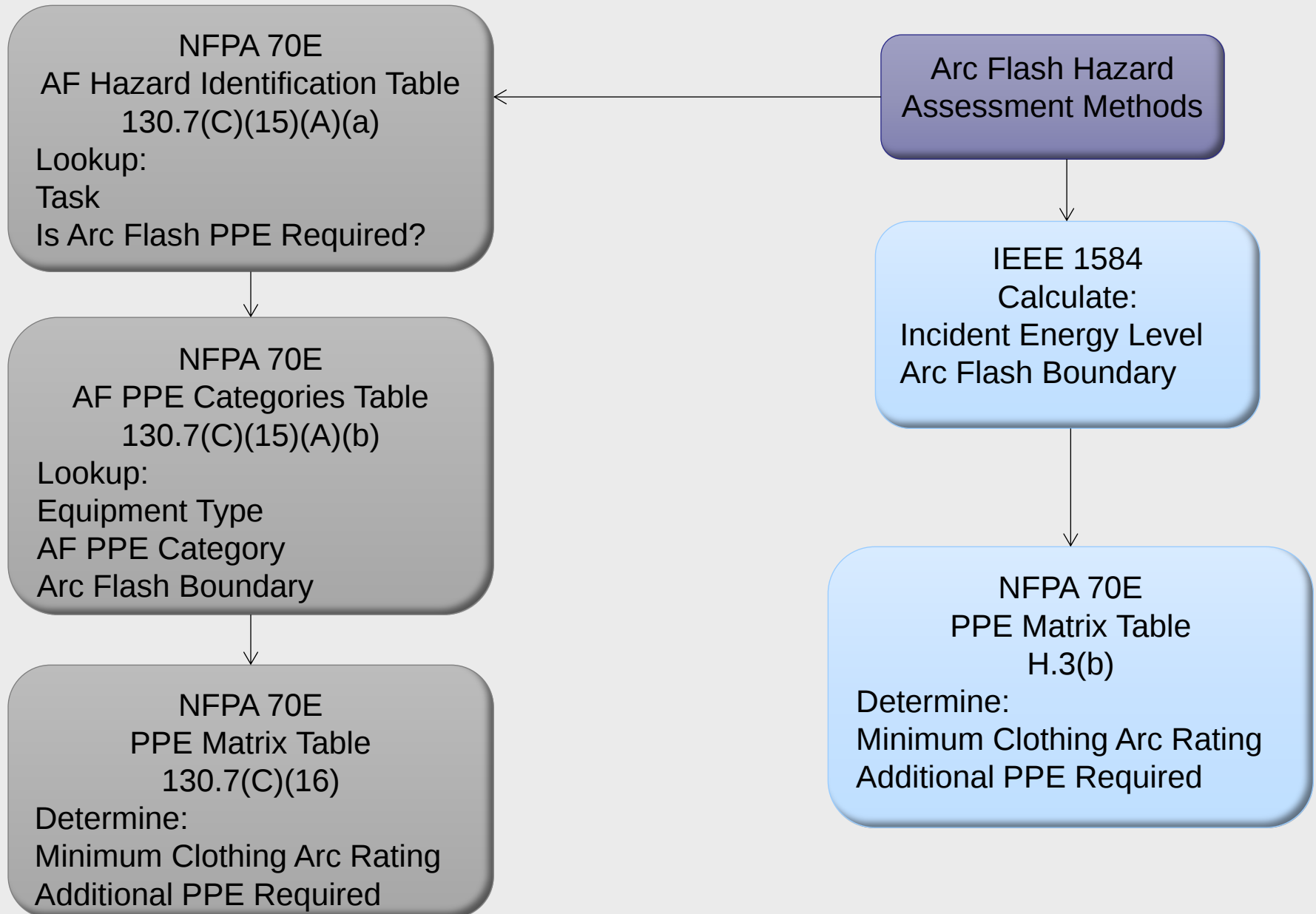


Article 130 - Work Involving Electrical Hazards

- **130.7(C)(15) Selection of Personal Protective Equipment When Required for Various Tasks**
- (A) Alternating Current (ac) Equipment. Where selected in lieu of the incident energy analysis of 130.5(B)(1), **Table 130.7(C)(15)(A)(a)** . **(New Table)** shall be used to identify when arc flash PPE is required. Table 130.7(C)(15)(A)(b) shall be used to determine the arc flash PPE category....

Article 130 - Work Involving Electrical Hazards

- **Table 130.7(C)(15)(A)(b) & Table 130.7(C)(15)(B) Task Tables**
 - *Arc Flash Hazard Category 0 has been removed!!!*
- **Table 130.7(C)(16) Protective Equipment (PPE)**
 - PPE Categories 1-4 (No Category 0)



Article 130 - Work Involving Electrical Hazards

- **130.10 Cutting or Drilling. (New Item)**
- Before cutting or drilling into equipment, floors, walls, or structural elements where a likelihood of contacting energized electrical lines or parts exists, the employer shall perform a risk assessment to:
 - Identify and mark the location of conductors, cables, raceways, or equipment,
 - Create an electrically safe work condition, and
 - Identify safe work practices and PPE to be used.

Before... You Dig, Drill or Cut:



**Know what's below.
Call before you dig.**

www.call811.com

Prior to excavation, employer shall take necessary steps to have electrical lines or equipment locations identified and marked

- If reasonable possibility for contacting electrical lines or equipment exists, appropriate safe work practices and PPE shall be used during excavation

Prior to cutting or drilling where there's a likelihood of contacting energized electrical lines or parts

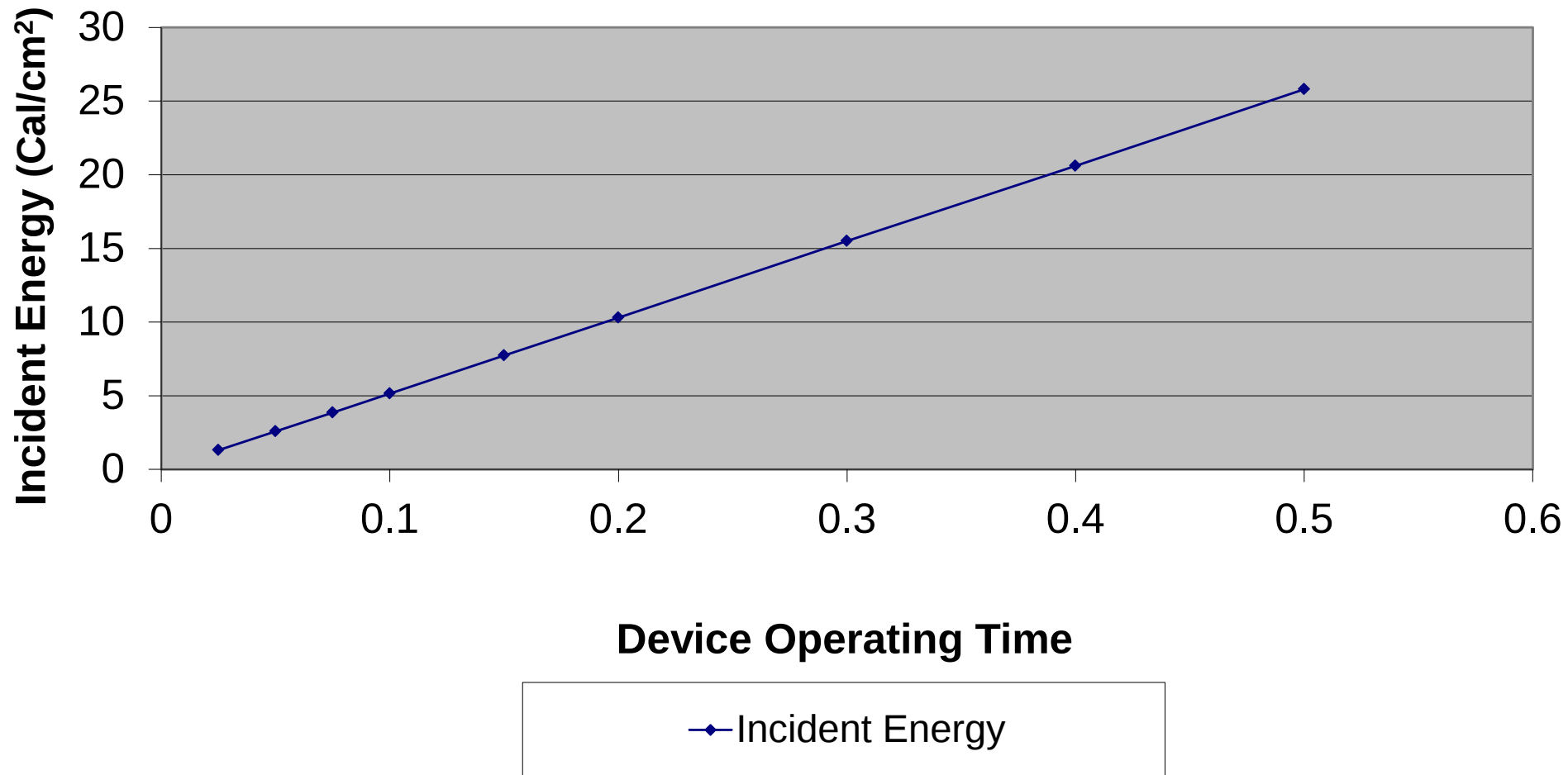
- ***Employer shall perform risk assessment to:***
 - ***Identify location***
 - ***Create an electrically safe work condition***
 - ***Determine safe work practices and PPE to be used***

***NFPA 70E 130.9
NFPA 70E 130.10***

Article 200 - Safety-Related Maintenance Requirements

- **205.3 General Maintenance Requirements**
 -The equipment owner or the owner's designated representative shall be responsible for maintenance of the electrical equipment and documentation.
- **205.15 Overhead Line Clearances. (New Section)**
 - For overhead electrical lines under the employer's control, grade elevation shall be maintained to preserve no less than the minimum designed vertical and horizontal clearances necessary to minimize risk of unintentional contact.
- **210.5 Protective Devices**
 - Informational Note: Improper or inadequate maintenance can result in increased opening time of the overcurrent protective device, thus increasing the incident energy.

Time vs. Incident Energy (Fault Current Constant @ 30 kA)



No PPE Required for Normal Operation If...

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- *Equipment is properly installed*
- *Equipment is properly maintained*
- *Equipment doors are closed and secured*
- *All equipment covers are in place and secured*
- *NO evidence of impending failure*
 - *No visible sign of failure*
 - *No historical evidence of failure*

No PPE Required for Normal Operation If...

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- Really?
- Is that a good idea?



NFPA 70E 130.2(A)(4)

Example Task Assignment

Tighten a loose connection on a circuit breaker in an energized 240 volt, 3 phase panelboard.

- Available fault current: 20 KA
- Tripping time for the upstream protective device is 2 cycles

		Y/N
1) Shock Hazard Present		
SHOCK	a) Limited Approach Boundary	
	b) Restricted Approach Boundary*	
		Y/N
2) Arc Flash Hazard Present		
3) Equipment Meets Table Parameters		
ARC FLASH	a) PPE category	
	b) Arc Flash Boundary	
		Y/N
4) EEWP Required		

* Insulated Gloves and Tools Required inside Restricted Approach Boundary 130.4(D)(1)

Is There a Shock Hazard?

- Is equipment ≥ 50 volts?
- Does the task require working inside the Restricted Approach Boundary?

Identify Shock Boundaries by Voltage

Pgs 26-27

Table 130.4(D)(a) Approach Boundaries to Energized Electrical Conductors or Circuit Parts for Shock Protection for Alternating-Current Systems (All dimensions are distance from energized electrical conductor or circuit part to employee.)

(1) Nominal System Voltage Range, Phase to Phase ^a	(2) Limited Approach Boundary ^b		(4) Restricted Approach Boundary ^b ; Includes Inadvertent Movement Adder
	Exposed Movable Conductor ^c	Exposed Fixed Circuit Part	
<50 V	Not specified	Not specified	Not specified
50 V–150 V ^d	3.0 m (10 ft 0 in.)	1.0 m (3 ft 6 in.)	Avoid contact
151 V–750 V	3.0 m (10 ft 0 in.)	1.0 m (3 ft 6 in.)	0.3 m (1 ft 0 in.)
751 V–15 kV	3.0 m (10 ft 0 in.)	1.5 m (5 ft 0 in.)	0.7 m (2 ft 2 in.)
15.1 kV–36 kV	3.0 m (10 ft 0 in.)	1.8 m (6 ft 0 in.)	0.8 m (2 ft 7 in.)

Example Task Assignment

Tighten a loose connection on a circuit breaker in an energized 240 volt, 3 phase panelboard.

- Available fault current: 20 KA
- Tripping time for the upstream protective device is 2 cycles

			Y/N
1) <i>Shock Hazard Present</i>			y
SHOCK	a) Limited Approach Boundary	3'6"	IF YES
	b) Restricted Approach Boundary*	1'	
			Y/N
2) <i>Arc Flash Hazard Present</i>			
3) <i>Equipment Meets Table Parameters</i>			

Find Task and Determine if PPE is Required

Pgs 35-36-37

Table 130.7(C)(15)(A)(a) Arc Flash Hazard Identification for Alternating Current (ac) and Direct Current (dc) Systems

Task	Equipment Condition*	Arc Flash PPE Required
Reading a panel meter while operating a meter switch	Any	No
Normal operation of a circuit breaker (CB), switch, contactor, or starter	All of the following:	No
Work on control circuits with exposed energized electrical conductors and circuit parts, greater than 120 V	Any	
Insertion or removal of individual starter buckets from motor control center (MCC)	Any	
Insertion or removal (racking) of CBs or starters from cubicles, doors open or closed	Any	
Insertion or removal of plug-in devices into or from busways	Any	
Insulated cable examination with no manipulation of cable	Any	
Insulated cable examination with manipulation of cable	Any	
Work on exposed energized electrical conductors and circuit parts of equipment directly supplied by a panelboard or motor control center	Any	
Insertion and removal of revenue meters (kW-hour, at primary voltage and current)	Any	Yes
Voltage testing on individual battery cells or individual multi-cell units	All of the following: The equipment is properly installed The equipment is properly maintained Covers for all other equipment are in place and secured There is no evidence of impending failure	No
	One or more of the following:	

Example Task Assignment

Tighten a loose connection on a circuit breaker in an energized 240 volt, 3 phase panelboard.

- Available fault current: 20 KA
- Tripping time for the upstream protective device is 2 cycles

			Y/N
1) <i>Shock Hazard Present</i>			y
SHOCK	a) Limited Approach Boundary	3'6"	IF YES
	b) Restricted Approach Boundary*	1'	
			Y/N
2) <i>Arc Flash Hazard Present</i>			y
3) <i>Equipment Meets Table Parameters</i>			

Find Equipment & Check Limits

Pgs 38-39

| Table 130.7(C)(15)(A)(b) Arc-Flash Hazard PPE Categories for Alternating Current (ac) Systems

Equipment	Arc Flash PPE Category	Arc-Flash Boundary
Panelboards or other equipment rated 240 V and below Parameters: Maximum of 25 kA short-circuit current available; maximum of 0.03 sec (2 cycles) fault clearing time; working distance 455 mm (18 in.)	1	485 mm (19 in.)
Panelboards or other equipment rated >240 V and up to 600 V Parameters: Maximum of 25 kA short-circuit current available; maximum of 0.03 sec (2 cycles) fault clearing time; working distance 455 mm (18 in.)	2	900 mm (3 ft)
600-V class motor control centers (MCCs) Parameters: Maximum of 65 kA short-circuit current available; maximum of 0.03 sec (2 cycles) fault clearing time; working distance 455 mm (18 in.)	2	1.5 m (5 ft)
600-V class motor control centers (MCCs) Parameters: Maximum of 42 kA short-circuit current available; maximum of 0.33 sec (20 cycles) fault clearing time; working distance 455 mm (18 in.)	4	4.3 m (14 ft)
600-V class switchgear (with power circuit breakers or fused switches) and 600 V class switchboards Parameters: Maximum of 35 kA short-circuit current available; maximum of up to 0.5 sec (30 cycles) fault clearing time; working distance 455 mm (18 in.)	4	6 m (20 ft)

PPE Category Specifications

Pg 40

Table 130.7(C)(16) **Personal Protective Equipment (PPE)**

PPE Category	PPE
1	Arc-Rated Clothing, Minimum Arc Rating of 4 cal/cm² (see Note 1) Arc-rated long-sleeve shirt and pants or arc-rated coverall Arc-rated face shield (see Note 2) or arc flash suit hood Arc-rated jacket, parka, rainwear, or hard hat liner (AN) Protective Equipment Hard hat Safety glasses or safety goggles (SR) Hearing protection (ear canal inserts) Heavy duty leather gloves (see Note 3) Leather footwear (AN)

PPE Category

- 4 **Arc-Rated Clothing Selected Rating Meets the Required**
- 40 cal/cm² (see Note 1)**
- Arc-rated long-sleeve shirt and pants or arc-rated coverall
- Arc-rated face shield (see Note 2) or arc flash suit hood
- Arc-rated jacket, parka, rainwear, or hard hat liner (AN)
- Protective Equipment**
- Hard hat
- Safety glasses or safety goggles (SR)
- Hearing protection (ear canal inserts)
- Heavy duty leather gloves (see Note 3)
- Leather footwear (AN)

AN: as needed (optional). AR: as required.

Notes:

Example Task Assignment

Tighten a loose connection on a circuit breaker in an energized 240 volt, 3 phase panelboard.

- Available fault current: 20 KA
- Tripping time for the upstream protective device is 2 cycles

			Y/N
1) <i>Shock Hazard Present</i>			y
SHOCK	a) Limited Approach Boundary	3'6"	IF YES
	b) Restricted Approach Boundary*	1'	
			Y/N
2) <i>Arc Flash Hazard Present</i>			y
3) <i>Equipment Meets Table Parameters</i>			y
ARC FLASH	a) PPE category	1	IF YES
	b) Arc Flash Boundary	19"	
			Y/N
4) <i>EEWP Required</i>			

* Insulated Gloves and Tools Required inside Restricted Approach Boundary 130.4(D)(1)

EEWP Requirements and Exemptions

Pgs 24-25 130.2 Energized Work. ...

(B) Energized Electrical Work Permit.

(1) **When Required.** When energized work is permitted in accordance with 130.2(A), an energized electrical work permit shall be required under the following conditions:

- (1) When work is performed within the restricted approach boundary
- (2) When the employee interacts with the equipment when conductors or circuit parts are not exposed but an increased likelihood of injury from an exposure to an arc flash hazard exists

(3) **Exemptions to Work Permit.** An energized electrical work permit shall not be required if a qualified person is provided with and uses appropriate safe work practices and PPE in accordance with Chapter 1 under any of the following conditions:

- (1) Testing, troubleshooting, and voltage measuring
- (2) Thermography and visual inspections if the restricted approach boundary is not crossed
- (3) Access to and egress from an area with energized electrical equipment if no electrical work is performed and the restricted approach boundary is not crossed
- (4) General housekeeping and miscellaneous non-electrical tasks if the restricted approach boundary is not crossed

Example Task Assignment

Tighten a loose connection on a circuit breaker in an energized 240 volt, 3 phase panelboard.

- Available fault current: 20 KA
- Tripping time for the upstream protective device is 2 cycles

			Y/N
1) <i>Shock Hazard Present</i>			y
SHOCK	a) Limited Approach Boundary	3'6"	IF YES
	b) Restricted Approach Boundary*	1'	
			Y/N
2) <i>Arc Flash Hazard Present</i>			y
3) <i>Equipment Meets Table Parameters</i>			y
ARC FLASH	a) PPE category	1	IF YES
	b) Arc Flash Boundary	19"	
			Y/N
4) <i>EEWP Required</i>			y

* Insulated Gloves and Tools Required inside Restricted Approach Boundary 130.4(D)(1)

What is easier and safer for the employees?

50

- Determining Fault Current and clearing times, then use NFPA 70E Task Tables
- or
- Look at the AF Label to determine the true energy level and AF boundary?

Arc Flash Hazard Labels - Bus

May also display such information as:

Voltage,

Flash hazard
boundary,

Approach distances,

Equipment name/ID #,

Upstream device.

 WARNING	
Arc Flash and Shock Hazard	
3 Ft 8 In	Flash Hazard Boundary
5.1	cal/cm ² Flash Hazard at 1 Ft 6 In
	Arc Rated Clothing Required (See NFPA 70E H.3(b) for additional PPE)
480 VAC	Shock Hazard when cover is removed
00	Glove Class
10 Ft 0 In	Limited Approach (Fixed Circuit)
12 In	Restricted Approach
09/30/2014	IEEE 1584-2002/2004a/2011b & NFPA 70E-2015
Equipment ID (Name):	MCC-STASRV1 (MCC STR SRV1)
Protective Device:	51 STA
Scenario 3 - Bus Tie Breakers Closed	
Study Performed By PowerStudies.com (253) 639-8535	

NFPA 70 130.3 (C)

Best Practice Label.

Label for Locations
where:

AF Energy > 40
cal/cm²

 DANGER	
Arc Flash and Shock Hazard	
11 Ft 10 In	Flash Hazard Boundary
45.3	cal/cm ² Flash Hazard at 1 Ft 6 In
	No PPE Exists - Do Not Work on Equipment while Energized!
480 VAC	Shock Hazard when cover is removed
00	Glove Class
10 Ft 0 In	Limited Approach (Fixed Circuit)
12 In	Restricted Approach
09/30/2014	IEEE 1584-2002/2004a/2011b & NFPA 70E-2015
Equipment ID (Name):	MCC-AUX-1 (MCC AUX 1)
Protective Device:	50/51 XA1
Scenario 2 - Normal Power	
Study Performed By PowerStudies.com (253) 639-8535	

NFPA 70 130.3 (C)

Best Practice Label.

- Questions???

An EEWP is Required When?

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ENERGIZED ELECTRICAL WORK PERMIT

1392

PART I: TO BE COMPLETED BY THE REQUESTER OF ENERGIZED WORK

Description of circuit/equipment/job location: Building 280 Carbon Kiln 12
Exit vestibule outer "door up" unit switch.

Description of work to be done: Replace 120V "door up" limit switch.

Justification of why the circuit/equipment cannot be de-energized or the work deferred until the next scheduled outage: Kiln must run 24/7 and next outage is not scheduled for 6 months.
De-energizing the kiln creates an explosion hazard.

Requester: Al Havens, Supervisor Date: 9-2-2011

PART II: TO BE COMPLETED BY THE ELECTRICALLY QUALIFIED PERSONS DOING THE WORK:

(1) Detailed job description procedure to be used in performing the above detailed work:
Follow JSA 101

(2) Description of the safe work practices to be employed: Defined in the JSA.
Second qualified employee will have on MSA SCBA, Arc Rated PPE, and VR gloves with Salisbury DI Hook for rescue.

(3) Shock hazard analysis: Must use Class 0 VR gloves per JSA

(a) Limited approach boundary: 42" (b) Restricted approach boundary: Avoid contact (c) Prohibited approach boundary: Avoid contact

(d) Necessary shock personal and other protective equipment to safely perform assigned task:
None other than listed above

(4) Results of the arc flash hazard analysis:

(a) Available incident energy or hazard/risk category: <1 cal but min is 8 cal PPE (b) Arc flash boundary: 9 inches per label

(c) Necessary arc flash personal and other protective equipment to safely perform the assigned task:
Barricade area and guard with operator on one end and rescue person at other end.

(5) Means employed to restrict the access of unqualified persons from the work area:

(6) Evidence of completion of a job briefing, including discussion of any job-related hazards:
JSA pulled and read, EWP completed, Danger tape and attendants briefed.

(7) Do you agree the above-described work can be done safely? Yes ☒ No ☐ (If no, return to requester.)

Bill Shinn Date: 9-2-2011
Electrically Qualified Person(s)

Drake Drobnick Date: 9-2-2011
Electrically Qualified Person(s)

PART III: APPROVAL(S) TO PERFORM THE WORK WHILE ELECTRICALLY ENERGIZED

Lee Hale Date: 9-2-2011
Manufacturing Manager

Jennifer Morris Date: 9-2-2011
Safety Manager

Nancy Lewis Date: 9-2-2011
General Manager

Hugh Hongland Date: 9-2-2011
Maintenance/Engineering Manager

Terri Wettle, Union Steward Date: 9-2-2011
Electrically Knowledgeable Person

Note: When work is complete, forward for the site safety department for retention.

- Performing energized work, per 130.2(A) within the **restricted approach boundary**
- When employee interacts with equipment and an increased likelihood of injury from an arc flash exposure exists**
 - conductors or circuit parts need not be exposed**

Read NFPA 130.2 and 130.2(B)(1)

This issue should be addressed especially in HV applications

Energized Electrical Work Permit (EEWP)

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- Requires written approval from management
- Requires the worker to do the following:
 - Identify and understand the hazards
 - Be a qualified person
 - Wear the proper PPE
 - Restrict access to unqualified persons
 - Complete a job briefing

NFPA 70E 130.2(B)(2)

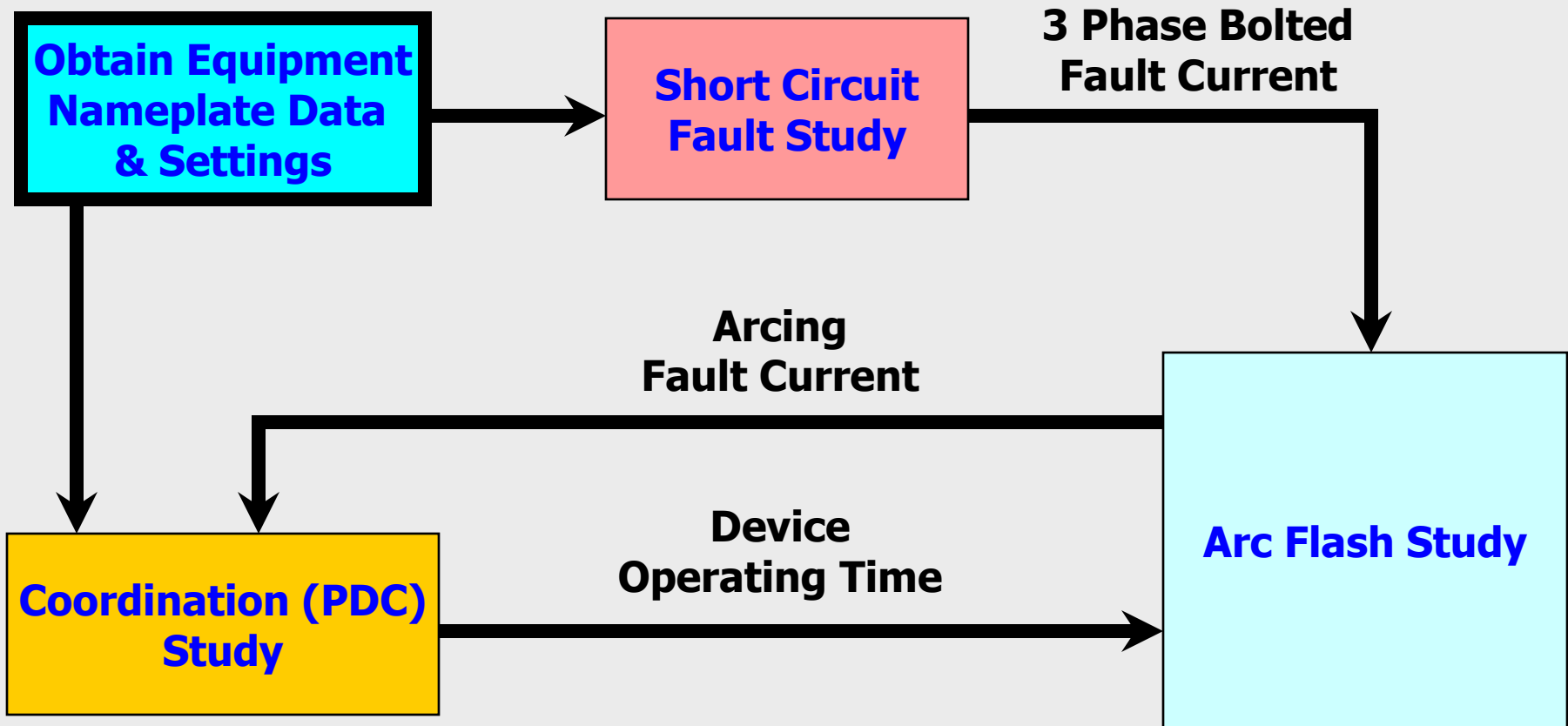
No EEWP Required for:

- Testing, troubleshooting, and voltage measuring
- ***If the Restricted Approach Boundary is not crossed:***
 - *Thermography and visual inspections*
 - *Access to and egress from area with energized electrical equipment, if no electrical work is performed*
 - *General housekeeping and miscellaneous non-electrical tasks*

**Must still follow
safe work practices and
PPE guidelines**

TESTING IS TOUCHING.





**WARNING**

Arc Flash and Shock Hazard

3 Ft 8 In	Flash Hazard Boundary
5.1	cal/cm ² Flash Hazard at 1 Ft 6 In
	Arc Rated Clothing Required (See NFPA 70E H.3(b) for additional PPE)
480 VAC	Shock Hazard when cover is removed
00	Glove Class
10 Ft 0 In	Limited Approach (Fixed Circuit)
12 In	Restricted Approach

09/30/2014 IEEE 1584-2002/2004a/2011b & NFPA 70E-2015
Equipment ID (Name): MCC-STASRV1 (MCC STR SRV1)
Protective Device: 51 STA

Scenario 3 - Bus Tie Breakers Closed
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