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1.0 PURPOSE AND SCOPE

1.1.1. This policy provides all Power Generation Division (PGD) NextEra Energy Resources (NEER) and FPL Solar and Storage employees shock and arc flash mitigation requirements when working on energized parts, components or equipment with potential arc flash exposure.

1.1.2. These requirements apply to all electrical equipment, both AC and DC, with nominal system voltages greater than 50 volts.

2.0 REFERENCES AND COMMITMENTS

2.1 Performance References

2.1.1. SMS 202, Risk Assessment and Mitigation

2.1.2. SMS 301.0.00 Electrical Safety Program (Definitions)

2.1.3. SMS 301 Series Documents

2.1.4. Renewable In-Plant Clearance

2.2 Developmental References

2.2.1. National Fire Protection Association (NFPA) 70, National Electrical Code (NEC)

2.2.2. National Fire Protection Association (NFPA) 70E, Standard for Electrical Safety in the Workplace - 2015

2.2.3. National Electrical Safety Code /Institute for Electrical and Electronic Engineers (NESC/IEEE 2017)

2.3 Commitments

2.3.1. OSHA 29 CFR 1910

2.3.2. National Electrical Safety Code /Institute for Electrical and Electronic Engineers (NESC/IEEE 2012)

2.3.3. American National Standards Institute / International Safety Equipment Association (ANSI/ISEA)

2.3.4. 208-V Arc Flash Testing: Network Protectors and Meters. EPRI, Palo Alto, CA: 2010. 1022218

2.3.5. Federal Register Vol. 79, No. 70 / Friday, April 11, 2014 / Rules and Regulations, page 20489: Final ruling on use of face shield at 8 ca/cm2 and 4 cal/cm2 levels.

2.3.6. US Dept. of Labor, Interpretation Letter, 07/13/2015 – Selecting protective clothing based on the IEEE National Electrical Safety Code, C-2, 2012.

2.3.7. Canada Occupational Health and Safety Regulation (SOR/86-304)

3.0 SAFETY AND ENVIRONMENTAL

3.1 Safety

3.1.1. Precautions

1. When an electrical contact and/or arc flash hazard exists, execute steps to achieve the safest working conditions using the following order of preference:

    a. Working De-energized – (Elimination)

    b. Working Energized (with Maintenance Mode enabled) – Use of Maintenance Mode to lower Incident Energy (cal/cm2) levels (Engineering & PPE)

    c. Working Energized (when Maintenance Mode is not installed) – (PPE)

3.1.2. Multiple employee requirements

1. A minimum of two employees shall be present while performing the following types of work:

    a. Installation, removal, or repair of lines energized at more than 600 volts.

    b. Installation, removal, or repair of de-energized lines if an employee is exposed to contact with other parts energized at more than 600 volts.

    c. Installation, removal, or repair of equipment, if an employee is exposed to possible contact with parts energized at more than 600 volts.

    d. Work involving the use of mechanical equipment near parts energized at more than 600 volts.

    e. Work that exposes an employee to an electrical hazard greater than, or equal to, the electrical hazards posed by operations specifically identified in 3.1.2 (a-d).

3.2 Environmental

3.2.1. None

4.0 INSTRUCTIONS

4.1 General Requirements

4.1.1. Employees shall adhere to requirements of this document when exposed to possible arc flash or potential shock hazards.

4.1.2. When performing tasks on electrical equipment any exposed jewelry, watches, key chains, rings, metal belt buckles or other such items shall not be worn. If personal metal components cannot be removed extra precaution shall be taken to insulate these components from the body and reduce the risk of injury from shock or high heat from arc flash.

4.1.3. Only Electrically Qualified employees shall work near exposed or energized electrical equipment (refer to SMS 301.1.00 for definitions)

4.1.4. Unqualified personnel shall not open enclosures, panels, or cabinets that contain exposed energized electrical parts or equipment.

NOTE

Equipment shall be considered to be live (i.e., energized) until proven otherwise by approved testing methods.

4.1.5. When creating an electrically safe work environment the following steps shall be taken:

1. Follow the Renewable-In-Plant-Clearance process to identify, isolate, track, and verify all possible sources of electrical energy related to the equipment.

2. If the system requires grounding, refer to SMS 301.2 series for Grounding processes.

3. Notify other employees in the area of any potential hazards, and if required, barricade the work area to prevent unauthorized entry.

4.1.6. SMS 202 Risk Assessment and Mitigation process shall be completed prior to any electrical work.

1. The pre-job briefings shall discuss hazards, work procedures, special precautions, protective equipment, energy source controls, and clearance/switching procedures.

2. Additional briefings shall be conducted if conditions change that could affect health and safety of employees involved or if crew changes are made during a job. Work shall be stopped and reassessed with an additional job briefing completed with all employees involved.

4.1.7. Renewable In-Plant Clearance (IPC/RIPC), High Voltage (HV) Clearance or Lock Out Tag Out (LOTO) process shall be established prior to servicing or maintaining electrical components (i.e., machines, equipment) in which unexpected energization, start-up, or release of stored energy could cause injury to employees or equipment.

1. EXCEPTIONS: IPC or LOTO shall not be required is when:

    a. Energized equipment / circuits operate at less than 50 volts AC or DC and exposure to electrical burns or explosion caused by electrical arcs is not increased.

    b. De-energizing increases hazards.

    c. De-energizing is infeasible because of equipment design or operational limitations.

    d. When troubleshooting of equipment requires equipment to be in an energized state.

4.1.8. Refer to Attachment 3: Electrical PPE & Tooling Table requirements when an In-Plant Clearance has not being established.

4.2 WIND ONLY

4.2.1. Electrical systems shall not be accessed when the turbine is "On-Line".

4.3 Arc Flash Hazard

4.3.1. Description

1. A dangerous condition associated with possible release of energy caused by an electric arc.

2. An arc flash hazard may exist when energized electrical conductors or circuit parts are exposed or when they are within equipment in a guarded or enclosed condition; provided a person is interacting with the equipment in such a manner that could cause an electric arc.

3. Under normal operating conditions, enclosed energized equipment that has been properly installed and maintained is not likely to pose an arc flash hazard.

4.4 Exposure Assessment (Arc Flash Study)

1. PGD Technical Services group shall ensure each PGD NEER site has an Arc Flash Exposure Assessment performed to provide an accurate exposure assessment.

2. Arc Flash Exposure Assessments shall be based on actual Incident Energy (cal/cm^2) Levels determined during arc flash studies performed on a specific facility or similar facilities.

3. WIND ONLY: Wind Arc Flash Studies can be accessed via active link below.

    a. Wind Arc Flash Studies

4. F&S ONLY: F&S Arc Flash Studies can be accessed via active link below.

    a. F&S Arc Flash Studies

5. Employees shall adhere to equipment specific arc flash labels and/or studies to assess the proper level of Personal Protective Equipment (PPE) requirements and working distances.

    a. Re-evaluation of an arc flash exposure shall be performed after any major changes that affect electrical system and components.

    b. Exposure studies performed at facilities equipped with Maintenance Mode limiting devises shall include Incident Energy (cal/cm2) levels with the Maintenance Mode activated.

    c. Arc flash hazard levels shall be calculated for the highest exposure for which a component may be subjected to.

    d. Similar systems, components, and common technology may be rated based on previous established calculations.

    e. Pre-existing Arc Flash labeling found on new equipment shall be reviewed by PGD Electrical Fleet team for correctness.

4.5 Labeling

1. Electrical components and panels shall be labeled with incident energy levels determined by a technology specific Arc Flash Study's. Attachment 1, identifies samples of FPL Solar & Storage Arc Flash Labels and Attachment 2, identifies samples of NEER Arc Flash Labels

    a. Arc Flash Labels are available through Southeast Printing Company's storefront.

    b. Southeast Printing Store Front

2. Arc Flash Labels applied from an existing Arc Flash Study or an OEM Arc Flash study do not need to be replaced with standard PGD labels as long as the label contains the equivalent information.

4.6 Exposure Reduction

1. Employees shall use the hierarchy of hazard control to mitigate arc flash hazard exposure as illustrated below.

WARNING

Employees shall not operate equipment that would require Arc Flash PPE greater-than 40 cal/cm²

2. For arc flash exposure greater than 40 cal/cm², one or more of the following shall be done to reduce the hazard exposure:

   a. De-energized equipment at a position upstream of the equipment where the exposure level is equal to or less than 40 cal/cm²

   b. Increasing the "Working Distance" shall be considered when working near exposed energized equipment preferably enough to place the employee outside Arc Flash Boundary

      (1) Increase the working distance between the equipment and employee(s) to reduce or eliminate exposure (i.e. use of live line tools).

      (2) Utilize Remote Racking Devices (RRD) and Remote Operating Devices (ROD) when available, to increase the working distance.

   c. PGD Engineering Technical Services (ETS) shall determine if system settings such as "Maintenance Mode" should be used to reduce employee exposure and provide recommendations of installation and use.

      (1) At facilities where "Maintenance Mode" is available for relay settings, "Maintenance Mode" shall be used to reduce the hazard exposure level.

(2) A "Permit Tag" shall be used to provide a notice of the existence of an administrative boundary as per SMS 301.1.20 High Voltage Basic of Switching Manual.

(3) Permit Tags shall be placed at the location of the Maintenance Mode switch or relay being controlled.

4.7 Arc Flash Personal Protective Equipment (PPE)

1. Employees exposed to arc flash potential from electrical parts equipment shall wear PGD provided arc flash PPE as identified on the posted Arc Flash Labels (reference Attachments 1 & 2).

2. Arc flash PPE shall be inspected prior to each use.

3. Only PGD issued PPE (i.e., Standard Uniform, Cold Weather Outerwear) or approved items, purchased through a PGD approved supplier shall be worn as outer layer of protection.

    a. Higher arc flash rated protection shall be worn over uniforms for tasks requiring greater arc flash protection then the standard uniforms as identified in Attachments: (5) FPL - Protective Clothing and PPE and (6) NEER - Protective Clothing and PPE.

4. Arc flash personal protective equipment shall worn be fully fastened (buttoned/zippered).

5. Outer layer of arc flash personal protective equipment (i.e., coveralls, combination of arc rated shirts and pants, jackets, or arc flash suits) shall meet or exceed arc flash label rating for equipment being worked on.

6. Site Management shall be responsible to ensure arc flash PPE is kept clean, in reliable condition, and free of oil, grease or other materials that may affect the overall effectiveness of the arc rating.

7. Insect repellents containing DEET shall not be used on arc flash clothing or PPE.

8. Soiled or compromised arc flash PPE shall not be worn and must be removed from service.

9. Arc flash suits shall be inspected quarterly; completed inspections shall be tracked with Maximo Preventative Maintenance (PM) and Standard Instruction (SI) for Wind & FPL Solar and Storage.

10. Garments worn under arc flash personal protective equipment shall be arc rated or made of 100% natural materials (e.g., cotton, wool, silk).

    a. Elastic and other types of similar material that are used in undergarments, sleeves, socks etc. is acceptable as per the "National Electric Safety Code (NESC)".

4.7.2. Additional arc flash PPE and tooling required for specifics tasks is listed in Attachment 3, Electrical PPE & Tooling Table.

4.8 Shock Hazard

4.8.1. Description

1. An electric shock occurs when a person comes into contact with an electrical energy source. Electrical energy flows through a portion of the body causing a shock. Exposure to electrical energy may result in no injury at all or may result in devastating damage or death.

4.9 Minimum Approach Distance (MAD)

4.9.1. The minimum approach distance that must be maintained between employees and exposed energized electrical circuits.

4.9.2. Qualified employees shall not approach or take any non-insulated object/tool closer to expose energized parts than the minimum distance identified within the MAD tables listed in Attachment 4, Minimum Approach Distance Table.

4.9.3. Qualified employees working within MAD shall be insulated from energized circuits with appropriately rated rubber gloves and/or sleeves.

1. Energized circuits may be insulated from employees using dielectric equipment such as line hoses, rubber blankets, or other electrical insulating materials rated for the exposure voltage.

4.10 Electrical Shock Personal Protective Equipment (PPE)

4.10.1. Electrical protective rubber gloves shall be tested before first issuance and re-tested every six (6) months or as governed by local /state regulations, whichever is stricter.

NOTE

Canadian sites are required to have rubber gloves rated > 5000vac tested at a minimum interval of every 3 months.

1. FPL Solar and Storage, electrical protective rubber gloves shall be tested monthly.

2. Electrical protective rubber gloves shall be visually inspected before each use, as well as performing an air test (NEER) or water test (FPL) to ensure integrity.

3. Electrical protective rubber gloves shall be used for maximum voltage exposure.

   a. Class 0 – 1,000 volts AC or 1,500 volts DC

   b. Class 1 – 7,500 volts AC or 11,250 volts DC

   c. Class 2 – 17,000 volts AC or 25,500 volts DC

d. Class 3 – 26,500 volts AC or 39,750 volts DC

e. Class 4 – 36,000 volts AC or 54,000 volts DC

4. Phase to phase voltage rating shall be used to determine class requirements on multi-phased circuits.

5. Phase-to-ground voltage can be used if there is no multiphase exposure or if energized conductors have been covered with rubber protective equipment, eliminating the possible multiphase exposure.

6. Ensure the Flashover Distance meets the specifications in the table below.

Distance Required Between Leather Cuff and Rubber Cuff

Class	Distance, min	
	in.	mm
0, 00	½	13
1	1	25
2	2	51
3	3	76
4	4	102

4.10.2. Leather protectors,

1. Shall be worn over electrical protective rubber gloves

a. EXCEPTION: While working on less than 250 volts AC or DC; Class 0 electrical protective rubber gloves can be used without leathers protectors to necessitate unusually high finger dexterity. Electrical protective rubber gloves that have been used without leather protectors shall NOT to be used again until re-tested.

2. Shall not be used for any other purpose

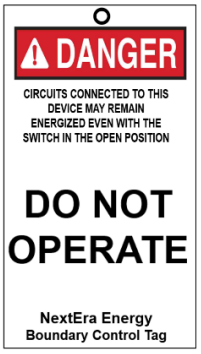
4.11 Boundary Control Process for Solar PV and Battery Storage

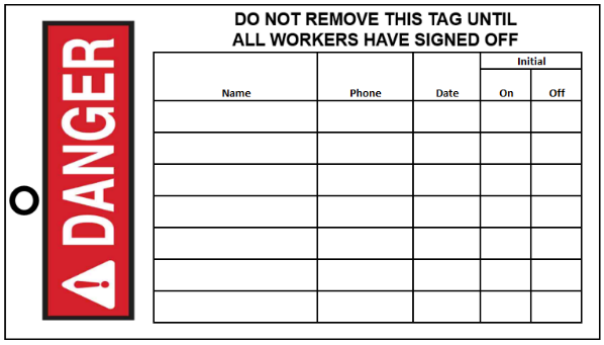
4.11.1. The Boundary Control process shall be used in circumstances where a Renewables In-Plant-Clearance would be inappropriate because specific equipment restrictions, e.g. solar panels and batteries which cannot have all sources of energy isolated from the work location.

1. This process shall not be considered a Renewables In-Plant Clearance, as energy potential will still exist at the work location.

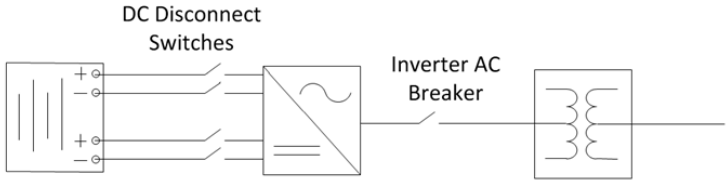
4.11.2. Appropriate shock and arc flash PPE shall be required when working on equipment under a Boundary Control.

4.11.3. Shown below is a Boundary Control tag which functions as a DO NOT OPERATE tag and shall be used to identify and secure electrical energy isolating devices in the open positon controlling the flow of electrical current at a work location.

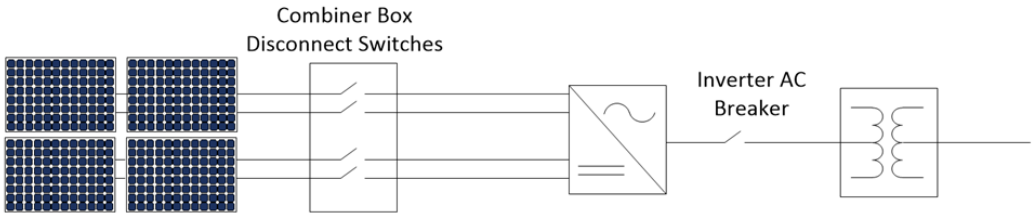




4.11.4. Any device that prevents electrical current flow at a work location may be used as a boundary control point, for example in the BESS circuit below, either the DC disconnect switches or the inverter AC breaker could be tagged open to prevent the flow of current to/from the batteries. In the solar array circuit below, either the combiner boxes disconnect devices, or the inverter AC breaker could be used.



BESS – an open and tagged switch ensures no load, but circuits may remain energized



Solar array – an open and tagged switch ensures no load, but circuits may remain energized

4.11.5. When verifying a Boundary Control Point, the circuit shall be tested for zero current flow instead of a Hot-Cold-Hot test, prior to starting work.

4.11.6. Boundary Control Tags as identified in section 4.11.3 shall be used to control the energy isolation points.

1. Locking Devices and Tags shall be placed on all devices that are secured in the isolated or at the controlled position as required to prevent current flow at the work location.

2. The following requirements shall be met when placing Boundary Control Tags on Energy Isolating or Control devices:

    a. Completed with permanent ink in a legible manner

    b. Placed in a conspicuous manor at the location of each Boundary Control device

    c. Placed in a location that presents no danger to employees when installing, verifying, or removing the tags

3. When there is no means to place a Locking Device and Boundary Control tag to secure the Energy Isolating Device in an isolated position, one of the following methods shall be used (listed in ordered of preference):

    a. Modify the Boundary Control device to enable it to be secured and tagged in the desired position

    b. Use an approved accessory attachment to enable the device to be secured and tagged.

    c. Expand the Boundary Control point to include a device that can be secured and tagged.

4. Once established as a Boundary Control; the position, condition, status, or the position of the tagged shall not be changed.

4.11.7. An employee securing the Boundary Control Device and placing the tag shall include all of the required information including a contact phone number.

4.11.8. Employees conducting work under the protection of a Boundary Control must sign on to the back of the tag prior to starting work.

4.11.9. Employees signed onto the control tag shall be signed off on the back of the control tag prior to returning the Boundary Control Device to service.

4.11.10. Boundary Control process errors shall be reported using a SAM Near Miss/Unsafe Condition entry.

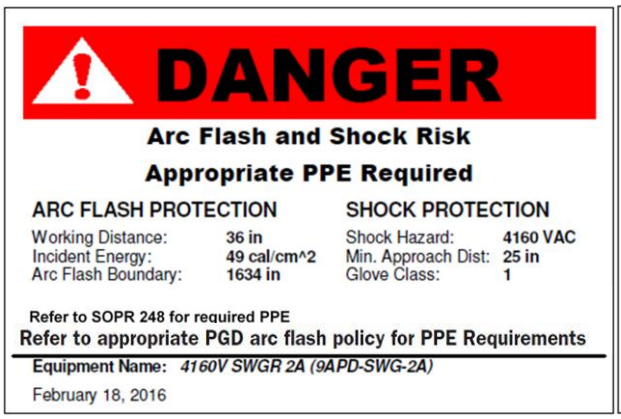
END of Instructions

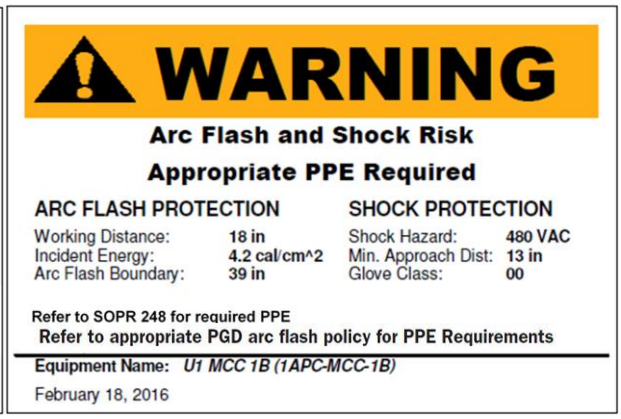
5.0 REVISION HISTORY

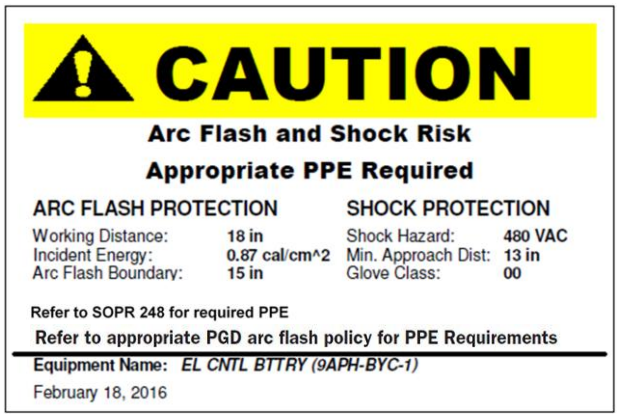
Rev #	Revision Description (Current Revision only)	Revised By: Job Role
3	Updated Language to include permit tag in section 4.6.2.c (2) and (3)	ESWP Team

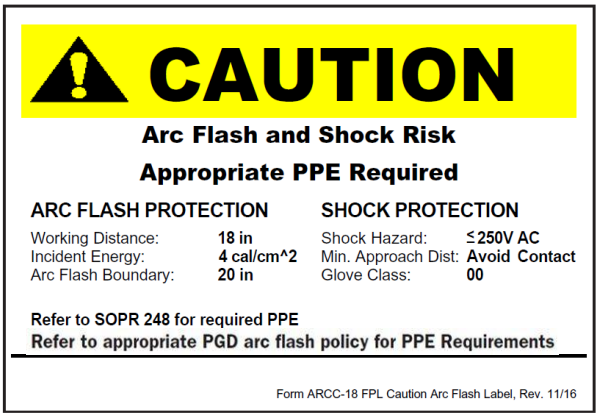
Attachment 1, FPL Solar & Storage ARC Flash Labels

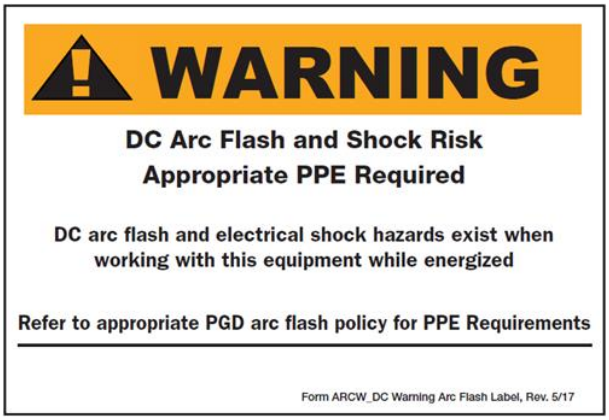
These are samples of arc flash labels that shall be posted on electrical components. Additional labels and the actually posted label may vary from the ones shown.

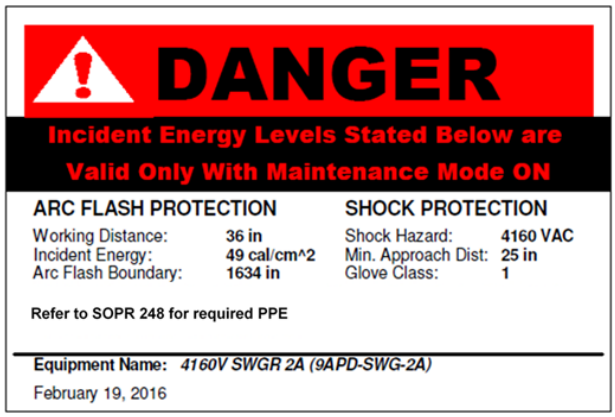






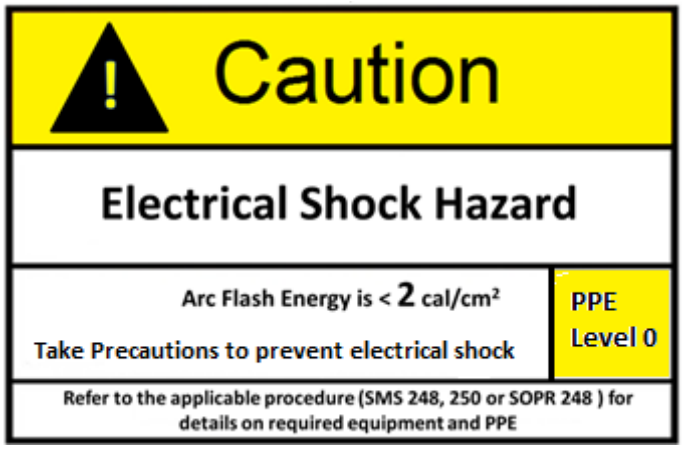


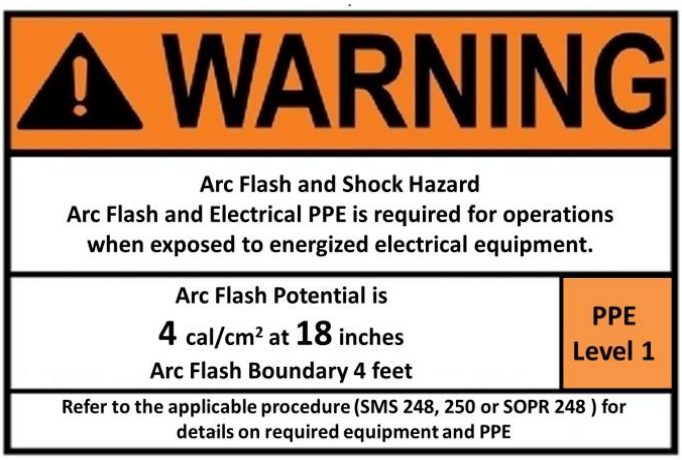


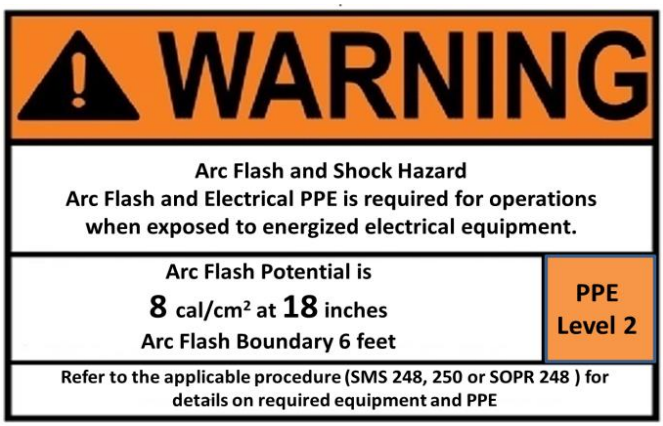


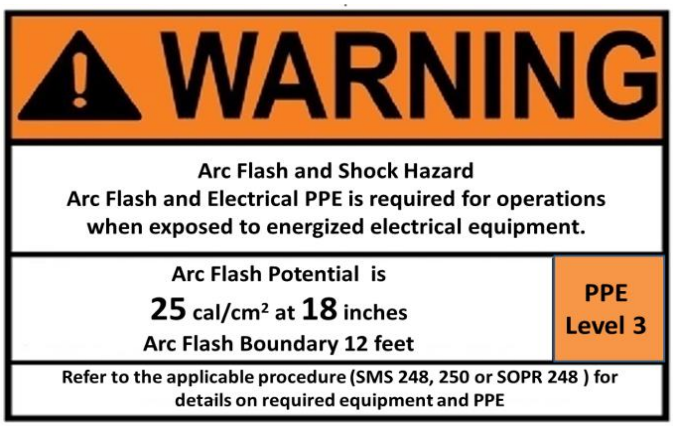
Attachment 2, NEER ARC Flash Labels

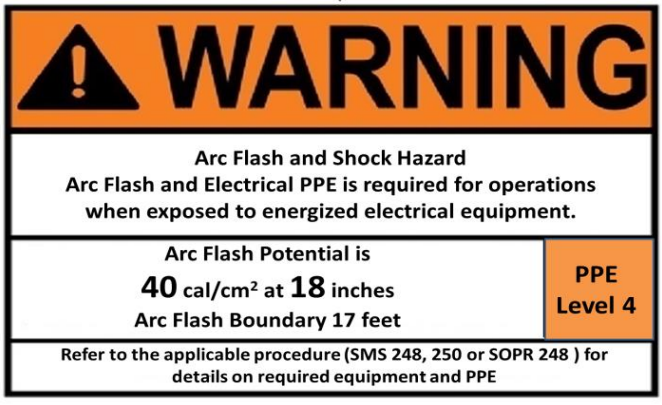
These are samples of arc flash labels that shall be posted on electrical components. There are additional labels and the actual label may vary from the ones shown.

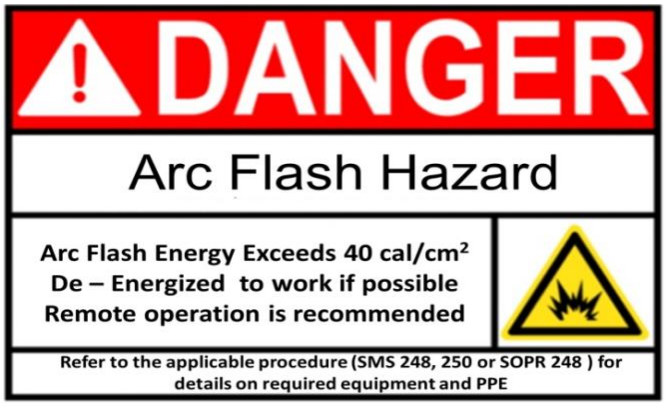












Attachment 3, Electrical PPE & Tooling Table

Task performed on equipment: 1. Within the arc flash boundary, AND 2. NOT cleared by an In-Plant Clearance	Arc Flash PPE Required	Rubber	Insulated
Panel boards OR Other Equipment Rated 240 V and Below			
Perform infrared thermography & other non-contact inspections outside the Minimum Approach Distance	N	N	N
Circuit breaker (CB) or switch operation with covers on (NOTE 1)	N	N	N
Circuit breaker (CB) or switch operation with covers off (NOTE 2)	N	N	N
Work on energized electrical conductors and circuit parts, including voltage testing	Y	Y	Y
Remove/Install CBs or switches	Y	Y	Y
Removal of bolted covers (to expose bare, energized electrical conductors and circuit parts)	Y	Y	N
Opening hinged covers (to expose bare, energized electrical conductors and circuit parts) (NOTE 2)	Y	N	N
Work on energized electrical conductors and circuit parts fed by a panel board circuit	Y	Y	Y
Panel boards OR Switchboards Rated >240 V AND up to 600 V (with molded case or insulated case circuit breakers)			
Perform infrared thermography & other non-contact inspections outside the Minimum Approach Distance	N	N	N
Circuit breaker (CB) or switch operation with covers on (NOTE 1)	N	N	N
Circuit breaker (CB) or switch operation with covers off	Y	Y	N
Work on energized electrical conductors and circuit parts, including voltage testing	Y	Y	Y
Work on energized electrical conductors and circuit parts of utilization equipment fed directly by a branch circuit of the panel board	Y	Y	Y
Removal of bolted covers (to expose bare, energized electrical conductors and circuit parts)	Y	Y	N
Opening hinged covers (to expose bare, energized electrical conductors and circuit parts) (NOTE 2)	Y	N	N
Work on energized electrical conductors and circuit parts fed by a panel board circuit	Y	Y	Y

600 V Class Motor Control Centers	Arc Flash PPE Required	Rubber	Insulated
Perform infrared thermography & other non-contact inspections outside the Minimum Approach Distance	Y	N	N
CB or switch or starter operation with enclosure doors closed (NOTE 1)	N	N	N
Reading a panel meter while operating a meter switch	N	N	N
CB or switch or starter operation with enclosure doors open	Y	N	N
Work on energized electrical conductors and circuit parts, including voltage testing	Y	Y	Y
Work on control circuits with energized electrical conductors and circuit parts >50V, exposed (NOTE 3)	Y	Y	Y
Insertion or removal of individual starter "buckets" from MCC	Y	Y	N
Application of temporary protective grounding equipment, after voltage test	Y	Y	N
Removal of bolted covers (to expose bare, energized electrical conductors and circuit parts)	Y	Y	N
Opening hinged covers (to expose bare, energized electrical conductors and circuit parts)	Y	N	N
Work on energized electrical conductors and circuit parts of utilization equipment fed directly by a branch circuit of the motor control center	Y	Y	Y
600V Class Switchgear (with power circuit breakers or switches)	Arc Flash PPE Required	Rubber	Insulated
Perform infrared thermography & other non-contact inspections outside the Minimum Approach Distance	N	N	N
CB or switch or starter operation with enclosure doors closed (NOTE 1)	N	N	N
Reading a panel meter while operating a meter switch	N	N	N
CB or switch or starter operation with enclosure doors open	Y	N	N
Work on energized electrical conductors and circuit parts, including voltage testing	Y	Y	Y
Work on control circuits with energized electrical conductors and circuit parts > 50V, exposed (NOTE 3) (NOTE 4)	Y	Y	Y
Racking CB's in or out from cubicles, doors open or closed	Y	Y	N
Application of temporary protective grounding equipment, after voltage test	Y	Y	Y

Removal of bolted covers (to expose bare, energized electrical conductors and circuit parts)	Y	Y	N
Opening hinged covers (to expose bare, energized electrical conductors and circuit parts)	Y	N	N
Other 600 V Class Equipment, Lighting OR small power transformers (600 V Max)	Arc Flash PPE Required	Rubber Insulating Gloves	Insulated Hand Tools
Work on energized electrical conductors and circuit parts, including voltage testing	Y	Y	Y
Application of temporary protective grounding equipment, after voltage test	Y	Y	N
Revenue Meters (kW-hour at primary voltage and current) insertion or removal	Y	Y	N
Cable trough or tray cover removal or installation that results in the disturbance of the cable	Y	N	N
Application of temporary protective grounding equipment, after voltage test	Y	Y	Y
Insertion or removal of plug into an energized receptacle	Y	Y	N
Removal of bolted covers (to expose bare, energized electrical conductors and circuit parts)	Y	Y	N
Opening hinged covers (to expose bare, energized electrical conductors and circuit parts)	Y	N	N
Performing generator collector brush inspections	Y	Y	N
Motor Starters, 2.3 kV through 7.2 kV			
Perform infrared thermography & other non-contact inspections outside the Minimum Approach Distance	Y	N	N
Reading a panel meter while operating a meter switch	N	N	N
Contactor operation with enclosure doors closed	N	N	N
Contactor operation with enclosure door open	Y	N	N
Work on energized electrical conductors and circuit parts, including voltage testing	Y	Y	Y
Work on control circuits with energized electrical conductors and circuit parts >50V, exposed (NOTE 3) (NOTE 4)	Y	Y	Y
Racking CB's in or out from cubicles, doors open or closed	Y	N	N
Application of temporary protective grounding equipment, after voltage test	Y	Y	N
Removal of bolted covers (to expose bare, energized electrical conductors and circuit parts)	Y	Y	N
Opening hinged covers (to expose bare, energized electrical conductors and circuit parts)	Y	N	N
Insertion or removal (racking) of starters from cubicles of arc-resistant construction, doors closed only	N	N	N

METAL CLAD SWITCHGEAR, 1 KV THROUGH 38 KV	Arc Flash PPE Required	Rubber Insulating Gloves	Insulated Hand Tools
Perform infrared thermography & other non-contact inspections outside the Minimum Approach Distance	N	N	N
Reading a panel meter while operating a meter switch	N	N	N
CB Operation with enclosure doors closed	Y	N	N
CB or switch or starter operation with enclosure doors open	Y	N	N
Work on energized electrical conductors and circuit parts, including voltage testing	Y	Y	Y
Work on control circuits with energized electrical conductors and circuit parts > 50V, exposed (NOTE 3) (NOTE 4)	Y	Y	Y
Racking CB's in or out from cubicles, doors open or closed	Y	N	N
Racking ground and test devices in or out from cubicles, doors open or closed	Y	N	N
Application of temporary protective grounding equipment to GTD after GTD is fully racked out and disconnected from the bus.	N	N	N
Application of temporary protective grounding equipment, after voltage test	Y	Y	N
Removal of bolted covers (to expose bare, energized electrical conductors and circuit parts)	Y	Y	N
Opening hinged covers (to expose bare, energized electrical conductors and circuit parts)	Y	N	N
Opening voltage transformer or control power transformer compartments	Y	N	N
Exceptions for Type 1 OR Type 2 ARC Resistant Switchgear			
CB operation with enclosure doors closed (NOTE 1)	N	N	N
Racking CB's in or out from cubicles, doors closed	N	N	N
Insertion or removal (racking) of ground and test device with door closed	N	N	N
Insertion or removal (racking) of voltage transformers on or off the bus door closed	N	N	N
OTHER EQUIPMENT 1KV THROUGH 38 KV	Arc Flash PPE Required	Rubber Insulating Gloves	Insulated Hand Tools
Switch operation of arc-resistant-type construction, doors closed only	N	N	N
Switch operation, doors closed	Y	N	N
Work on energized electrical conductors and circuit parts, including voltage testing	Y	Y	Y

Removal of bolted covers (to expose bare, energized electrical conductors and circuit parts)	Y	Y	N
Opening hinged covers (to expose bare, energized electrical conductors and circuit parts)	Y	N	N
Outdoor disconnect switch operation (hook stick operated)	Y	Y	Y
Outdoor disconnect switch operation (gang-operated, from grade)	Y	Y	N
Insulated cable examination, in man hole or other confined spaces	Y	Y	N
Insulated cable examination, in open area	Y	Y	N
SOLAR PV 600VDC-1500VDC			
Perform infrared thermography & other non-contact inspections outside the Minimum Approach Distance	N	N	N
Circuit breaker (CB) or switch operation with covers on/cabinet Doors closed (NOTE 1)	N	N	N
Circuit breaker (CB) or switch operation with covers off/Cabinet doors open	Y	Y	N
Work on energized electrical conductors and circuit parts, including voltage testing	Y	Y	Y
Removal of bolted covers (to expose bare, energized electrical conductors and circuit parts)	Y	Y	N
Opening hinged covers (to expose bare, energized electrical conductors and circuit parts) (NOTE 2)	Y	N	N
Work on energized electrical conductors and circuit parts fed by a panel board circuit	Y	Y	Y
Switch operation of arc-resistant-type construction, doors closed only	N	N	N
Insulated cable examination, in man hole or other confined spaces	Y	Y	N
Insulated cable examination, in open area	Y	Y	N
Y = Yes (required) N = No (not required)			
NOTE 1: Arc Flash PPE NOT required when equipment is properly installed, maintained, doors are closed and secured, covers are in place and secured, and there is no evidence of impending failure.			
NOTE 2: Arc Flash PPE NOT required when equipment is properly installed, maintained, and there is no evidence of impending failure.			
NOTE 3: If more than one type of circuit is exposed (e.g. 135V Control Circuit, 480V bus, or medium voltage bus), then the employee must wear appropriately rated arc flash PPE for the greater incident energy exposure.			
NOTE 4: If a breaker is completely racked out or out of the cubicle, and the shutters are fully functional and closed, the bus behind the shutters are not exposed for these purposes. For motor starters, if the disconnect switch is visibly open and shutters are closed, then the bus is not exposed for these purposes.			

Attachment 4, Minimum Approach Distance Table

Nominal Voltage Phase to phase	Minimum Phase to Ground Approach Distance (Ft-Inches)			
	Site Elevation in Feet (MSL) Above Mean Sea Level			
	Up to 3,000	3,001 to 4,000	4,001 to 5,000	5,001 to 8,200
301V to 750V (Note 1)	1'- 1"	1'- 2"	1'- 3"	1'- 5"
13.8KV	2'- 2"	2'- 3"	2'- 5"	2'- 9"
23KV	2'- 7"	2'- 8"	2'- 10"	3'- 3"
34.5KV	2' 7"	2'- 8"	2'- 10"	3'- 3"
69KV	3'- 4"	3'- 5"	3'- 8"	4'- 2"
115KV	3'- 9"	3'- 10"	4'- 1"	4'- 8"
138KV	4'- 4"	4'- 5"	4'- 8"	5'- 5"
230KV	6' 8"	6'- 9"	7'- 3"	8'- 4"
345KV	11' 3"	11'- 6"	12'- 3"	14'- 1"
500KV	16'- 8"	17'- 0"	18'- 2"	20'- 11"

NOTE 1: For single phase systems use voltage to ground. At 299V and below, avoid contact

NOTE 2: These distances take into consideration the highest switching surge an employee will be exposed to on any system with air as the insulating medium and the maximum voltages shown.

NOTE 3: The clear live-line tool distance shall equal or exceed the values for the indicated voltage ranges

Attachment 5, FPL Solar & Storage - Protective Clothing and PPE

Incident Energy Exposure	Minimum Protective Clothing and PPE
≤ 1.2 cal/cm2	
Protective Clothing, non-melting (ASTM F 1506) or untreated natural fiber	Shirt (long sleeve) and pants (long) or coverall
Other PPE	Safety glasses or safety goggles Hearing protection Heavy-duty leather gloves or rubber insulating gloves with leather protectors Leather footwear
> 1.2 to 4 cal/cm2	
Arc-rated clothing and equipment with an arc rating equal to or greater than the determined incident energy	Arc-rated long-sleeve shirt and arc-rated pants or arc-rated coverall Arc-rated jacket, parka, or rainwear (as needed) Note: Face shield not required when IE is 4 cal/cm2 or less
Other PPE	Hard hat Arc-rated hard hat liner (as needed) Safety glasses or safety goggles Leather footwear Hearing protection Heavy-duty leather gloves or rubber insulating gloves with leather protectors
> 4 to 12 cal/cm2	
Arc-rated clothing and equipment with an arc rating equal to or greater than the determined incident energy	Arc-rated long-sleeve shirt and arc-rated pants or arc-rated coverall or arc flash suit Arc-rated face shield and arc-rated balaclava or arc flash suit hood. Arc-rated jacket, parka, or rainwear (as needed) Note: Balaclava not required when IE is 8 cal/cm2 or less
Other PPE	Hard hat Arc-rated hard hat liner (as needed) Safety glasses or safety goggles Hearing protection Heavy-duty leather gloves or rubber insulating gloves with leather protectors Leather footwear
> 12 cal/cm2	
Arc-rated clothing and equipment with an arc rating equal to or greater than the determined incident energy	Arc-rated long-sleeve shirt and arc-rated pants or arc-rated coverall or arc flash suit Arc-rated arc flash suit hood Arc-rated gloves Arc-rated jacket, parka, or rainwear (as needed)
Other PPE	Hard hat Arc-rated hard hat liner (as needed) Safety glasses or safety goggles Hearing protection Heavy-duty leather gloves or rubber insulating gloves with leather protectors Leather footwear

Attachment 6, NEER - Protective Clothing and PPE

Electrical Arc Flash PPE Category (Revised 11/28/2018)			
PPE Level	**Incident Energy Range**	**Arc- Rated Clothing Minimum Arc Rating of 4 cal/cm²**	**PPE Required**
Caution PPE Level - 0	< 1.2 cal/cm²	Non Arc-Rated Clothing Minimum Arc Rating of < 2 cal/cm²	**Arc Protection:** Arc-rated long sleeve shirt and pants, or coveralls Arc-rated face shield or Arc flash suit hood Arc-rated jacket, parka, rainwear (as needed) Voltage rated rubber gloves/w leather protectors Heavy duty leathers or Arc Rated gloves (note #1 & #2) **Protective Equipment:** Class E hard hat (ANSI Z-89.1 2014) PGD Approved Safety glasses (ANSI Z-87.1 2010) Ear canal inserts (earplugs) hearing Protection Electrically rated safety footwear
PPE Level -1	1.2 cal/cm² to 4 cal/cm²	Arc- Rated Clothing Minimum Arc Rating of 4 cal/cm²	**Arc Protection:** Arc-rated long sleeve shirt and pants, or coveralls Arc-rated face shield or Arc flash suit hood Arc-rated jacket, parka, rainwear (as needed) Voltage rated rubber gloves/w leather protectors Heavy duty leathers or Arc Rated gloves (note #1 & #2) **Protective Equipment:** Class E hard hat (ANSI Z-89.1 2014) PGD Approved safety glasses (ANSI Z-87.1 2010) Ear canal inserts (earplugs) hearing Protection Electrically rated safety footwear
PPE Level -2	>4.1 cal/cm² to 8 cal/cm²	Arc-Rated Clothing Minimum Arc rating of 8 cal/cm²	**Arc Protection:** Arc-rated long sleeve shirt and pants, or coveralls Arc-rated face shield or Arc flash suit hood Arc-rated jacket, parka, rainwear (as needed) Voltage rated rubber gloves/w leather protectors Heavy duty leathers or Arc Rated gloves (note #1 & #2) **Protective Equipment:** Class E hard hat (ANSI Z-89.1 2014) PGD Approved Safety glasses (ANSI Z-87.1 2010) Ear canal inserts (earplugs) hearing Protection Electrically rated safety footwear
PPE level - 3	> 8.1 cal/cm² to 25 cal/cm²	Arc-Rated Clothing, minimum acr rating of 25 cal/cm²	**Arc Protection:** Arc-Rated long sleeve shirt and pants, or coveralls Arc-rated Flash Suit jacket, pants, and hood Voltage rated rubber gloves/w leather protectors Heavy duty leathers or Arc Rated gloves (note #1 & #2) Arc-Rated fiber jacket, parka, rainwear (as needed) **Protective Equipment:** Class E hard hat (ANSI Z-89.1 2014) PGD Approved safety glasses (ANSI Z-87.1 2010) Ear canal inserts (earplugs) hearing Protection Electrically rated safety footwear
PPE level - 4	>25.1 cal/cm² to 40 cal/cm²	Arc-Rated Clothing, minimum acr rating of 40 cal/cm²	**Arc Protection:** Arc-rated long sleeve shirt and pants, or coveralls Arc-rated Flash Suit jacket, pants, and hood Arc-rated fiber jacket, parka, rainwear (as needed) Voltage rated rubber gloves/w leather protectors Heavy duty leathers or Arc Rated gloves (note #1) **Protective Equipment:** Class E hard hat (ANSI Z-89.1 2014) PGD Approved Safety glasses (ANSI Z-87.1 2010) Ear canal inserts (earplugs) hearing Protection Electrically rated safety footwear
Dangerous	> 40 cal/cm²	Exposure must be reduced to 40 cal/cm² or less by de-energizing or using remote access equipment	System or componet shall be de-energized prior to work; or the equipment remotely operated; or work shall be done in accordance with a procedure designated to minimize employee exposure.