



Outsource UCC Arc Flash Regulation Program

2018 Cal-OSHA Arc Flash Regulations

In order to maintain compliance with the latest Cal-OSHA Arc Flash regulation and for work to be done on Southern California Edison property, Outsource Utility Contractor Corp. shall maintain strict adherence to the latest SCE Arc Flash Manuals. All electrical employees are to be trained and made familiar with the rules and regulations within these manuals prior to any work performed on energized lines and equipment. Every Foreman, supervisor, or employee in charge, and every employee working on or near energized equipment are responsible for adhering to all requirements within the manuals. Much of the information contained within this program is referenced from the SCE Arc Flash Manuals.

Arc Flash Definitions

1. Arc Flash – An arc flash is the result of a fast release of energy due to an arcing fault between phases, phase to ground, or phase to neutral.
2. Incident Energy (IE) – The amount of energy generated by an electric flash impressed on a surface at a certain distance from the source. Incident energy is measured in cal/cm^2
3. Arc Flash Boundary (AFB) – The distance at which a person working any closer at the time of an arc flash could receive a second degree burn if not properly protected by arc rating clothing. A second-degree burn is caused by an exposure of $2 \text{ cal}/\text{cm}^2$
4. Minimum Approach Distance (MAD) – Refer to Working Distance (Section 135, pg. 28 of the Outsource UCC Safety Manual).

AR PPE Rating and Layering Matrix – Distribution

There are five AR PPE ratings available for personnel working on or near distribution circuits. The AE PPE ratings are 8, 12, 25, 40 and 60 cal/cm². Table 1 shows the layering matrix for the ratings and only covers the required clothing for the five AR PPE ratings. Any energized equipment rated above 12 calorie shall be worked on using hot sticks. Currently, Outsource UCC does not use Arc Flash Category 4 Suits (should the need arise the company will readjust the program). Should a situation be deemed unsafe to hot stick, an emergency outage will be called in.

Outsource foremen, supervisors, and employees in charge are to reference the SCE Appendices for AR PPE for: Overhead: Rubber Gloving and Hot Sticking; Underground: Dead Front; Underground: Live Front; PMH; and Voltages 50 V to 600 V.

Table 1: AR PPE Layering Matrix for 8, 12, 25, 40 and 60 cal/cm² Ratings

AR PPE Clothing	8 cal	12 cal	25 cal	40 cal	60 cal
Base Layer T-Shirt or 12-Cal Shirt		X			
Outer Shirt	X	X	X		
Pants	X	X	X		
Heavy-Duty Coverall			X		
Balaclava		X	X		
Face Shield		X	X		
Gloves	X	X	X	X	X
Arc Flash Category 4 Suit (includes hood pants & jacket)				X	X

Arc Flash Hazardous Work Activities

Table 2 lists work activities and specifies if the activity is arc-flash hazardous:

Table 2: Work Activities

Work Activity	Is Employee Exposed to an Arc Flash Hazard?
For Overhead Work: Testing and Applying Grounds	YES Refer to Outsource Safety Manual, SCE APM and Grounding Manuals
For Underground Work: Applying Grounds	YES Refer to Outsource Safety Manual, SCE APM and Grounding Manuals
Removing/Installing test point covers of the Plug-in Terminations and testing voltage and phase	NO
Reading a cable label in a switch or pad-mounted transformer with a barrier present	NO Refer to Outsource Safety Manual and SCE APM rules and safety procedures
Reading a cable label in a switch or pad-mounted transformer with no barrier present	YES
Removing a barrier in a switch or pad-mounted transformer	NO
Rigging a switch	NO
Service Panel Diagnosis at 480 V (with approved insulation testing equipment)	NO Refer to Outsource Safety Manual and SCE APM rules and safety procedures
Any activity at 480 V (except for diagnosis)	YES See Appendix 5 of the SCE Distribution Arc Flash Manual
Install/Remove covers with sticks for climbing through	NO
Install/Remove covers with rubber gloves for climbing through	YES

PPE Selection Process

Outsource UCC currently has 3 options for conducting work on energized lines & equipment:

1. Verify that the equipment is acceptable for rubber gloving with 8-calorie PPE.
2. Verify that the equipment can be worked with 12-calorie PPE and wear additional FR (i.e. either additional undershirt or 12-cal shirt, balaclava, and hardhat with 12-cal face shield).
3. Verify that the equipment requires 25+ calorie PPE and employ the use of hot sticks (should a situation be deemed unsafe to hot stick, an emergency outage shall be called in).

THE CALORIE COUNT WILL ALWAYS BE NOTED IN THE PROPER SECTION OF THE TAILBOARD!!!

Overhead Branch Line Fusing

When working on 2.4 kV up to 25 kV distributions circuits beyond Overhead Branch Line Fusing (OBLF) with 14.4 kV SMU-20 200E rated fusing or similar type lower amperage rated fusing, 8 cal/cm² AR PPE is suitable to perform work on energized equipment in accordance with Outsource/SCE safety rules.

Working on Transmission Lines

When working on or near energized transmission lines or equipment, personnel shall refer to the Transmission Arc Flash Manual (TAFM) to obtain the proper AR PPE rating (available at Outsource headquarters and through safety personnel).

Working on Substations

When working on or near energized substation equipment, personnel shall refer to the Substation Arc Flash Manual (SAFM) to obtain the proper AR PPE rating (available at Outsource headquarters and through safety personnel).

Foremen, supervisors, and employees in charge are to refer to Appendices 1 through 6 of the SCE Distribution Arc Flash Manual to determine the proper caloric rating and AFB for Rubber Gloving and Hot Sticking. Outsource is to provide formal training to these employees pertaining to referencing the manual and determining the required AR PPE caloric ratings when workers will be performing arc-flash hazardous activities. The following is an excerpt from the manual illustrating the selection process (refer to the Manuals for additional work activities):

5.0 AR PPE Selection Process

Appendices 1 through 6 provide the required AR PPE caloric rating that workers shall wear when performing arc flash hazardous activities. Examples are provided below to illustrate the AR PPE selection process using the information on these appendices.

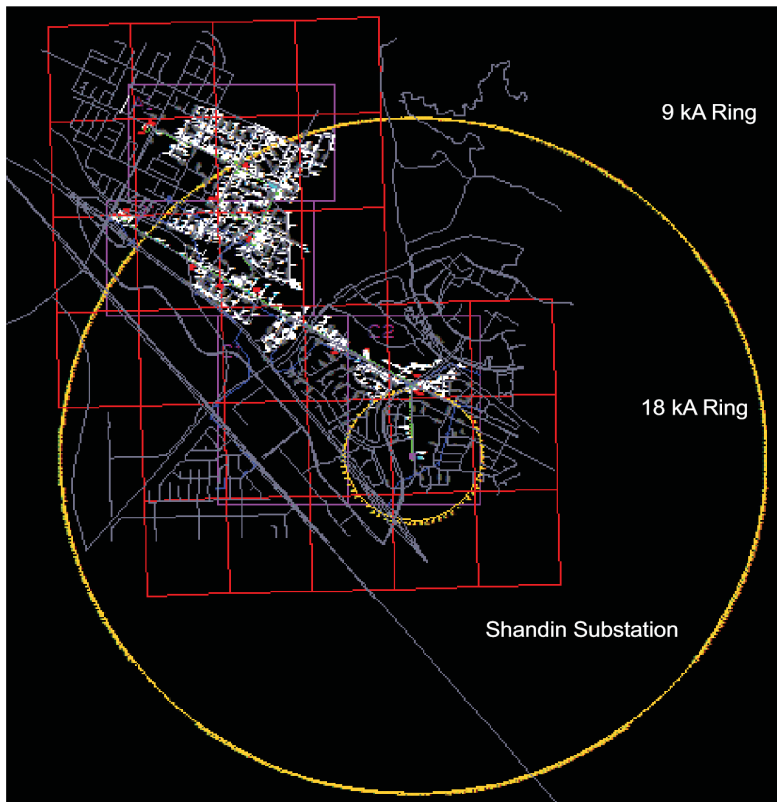
5.1 AR PPE Selection Example Using Appendix 1

The AR PPE information for Sweetwater 12 kV distribution circuit is used to demonstrate how to use the information in Appendix 1. [Table 3](#) shows the AR PPE requirements for rubber gloving and hot sticking work activities for Sweetwater, and Figure 1 shows its circuit map.

Table 3: Sweetwater 12 kV AR PPE Requirements for Rubber Gloving and Hot Sticking

Feeder Name	Rubber Gloving						Hot Sticking at MAD					
	Required PPE (cal/cm ²)	AFB (ft)	18 kA Ring Required PPE (cal/cm ²)	AFB (ft)	9 kA Ring Required PPE (cal/cm ²)	AFB (ft)	Required PPE (cal/cm ²)	AFB (ft)	18 kA Ring Required PPE (cal/cm ²)	AFB (ft)	9 kA Ring Required PPE (cal/cm ²)	AFB (ft)
Sweetwater	40	5	25	4	12	3	8	4	8	4	8	3

Figure 1: Sweetwater 12 kV Circuit Map



A. Rubber Gloving

The "Required PPE (cal/cm²)", "18 kA Ring Required PPE (cal/cm²)", "9 kA Ring Required PPE (cal/cm²)" columns identify the required AR PPE rating. If rubber gloving is performed inside the 18 kA grounding ring, the AR PPE to wear is under the "Required PPE (cal/cm²)" column. Based on [Table 3](#), a worker shall wear 40 cal/cm² AR PPE, and a person not wearing all the required 8 cal/cm² AR PPE as indicated in [Table 1](#) (outer shirt, pants and gloves) shall stand at a distance of 5'.

If the rubber gloving is performed outside the 18kA but inside the 9 kA grounding rings, the AR PPE to wear is under the "18 kA Required PPE (cal/cm²)" column. Based on [Table 3](#), a worker shall wear 25 cal/cm² AR PPE, and a person not wearing all the required 8 cal/cm² AR PPE shall stand at a distance of 4'.

Finally, if rubber gloving is performed outside the 9 kA grounding ring, the AR PPE to wear is under the "9 kA Required PPE (cal/cm²)" column. Based on [Table 3](#), a worker shall wear 12 cal/cm² AR PPE, and a person not wearing all the required 8 cal/cm² AR PPE shall stand at a distance of 3'.

B. Hot Sticking at MAD

The "Required PPE (cal/cm²)", "18kA Ring Required PPE (cal/cm²)", "9 kA Ring Required PPE (cal/cm²)" columns identify the required AR PPE rating. If hot sticking is performed inside the 18 kA grounding ring, the AR PPE to wear is under the "Required PPE (cal/cm²)" column. Based on [Table 3](#), a worker shall wear 8 cal/cm² AR PPE, and a person not wearing all the required 8 cal/cm² AR PPE as indicated in [Table 1](#) (outer shirt, pants and gloves) shall stand at a distance of 4'.

If the hot sticking is performed outside the 18 kA but inside the 9 kA grounding rings, the AR PPE to wear is under the "18 kA Required PPE (cal/cm²)" column. Based on [Table 3](#), a worker shall wear 8cal/cm² AR PPE, and a person not wearing all the required 8 cal/cm² AR PPE shall stand at a distance of 4'.

Finally, if hot sticking is performed outside the 9 kA grounding ring, the AR PPE to wear is under the "9 kA Required PPE (cal/cm²)" column. Based on [Table 3](#), a worker shall wear 8 cal/cm² AR PPE, and a person not wearing all the required 8 cal/cm² AR PPE shall stand at a distance of 3'.

DAFM		EFFECTIVE DATE 8-13-2018
PAGE 6	Distribution Arc Flash Manual	APPROVED 

Information Not Listed in the Appendices

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