

Appalachian Power Company Policy No. 2
Cover Up Procedures

Policy Summary:

- A. When a worker is in a position where the worker or a conductive object in the worker's hand can go or reach within the minimum approach distance of a conductor or equipment energized above 1000 volts phase to ground:
 1. The worker must wear insulating gloves and sleeves.
- B. When the worker described in A above can also reach a conductor or equipment energized above 1000 volts phase to ground either directly or with a conductive object:
 1. That equipment must be covered either with hand or stick applied cover up
 2. When using hand applied cover up, the worker will be working on the conductor so cover up requirements described in C below will apply
- C. When the worker described in B above is intending to contact a conductor or equipment energized above 1000 volts phase to ground either directly or with a conductive object (this would include the application of hand applied cover up):
 1. Cover up must be applied to all energized conductors and equipment and all conductors and equipment at ground or neutral potential within reach plus minimum approach of the worker's position or within minimum approach of the bucket
 2. Poles, cross arms, wooden braces and other hardware that may come in contact with primary voltages (i.e. tie wire) or which the worker may have to lean towards while doing the work must be covered.

1) Statement of Policy:

When working on or near conductors energized above 1000 volts to ground, it is necessary to take precautions to prevent the worker from inserting himself into an electrical path between different voltages. The consequences of this situation are so severe that the practice is to insulate the worker from any potential and from ground using a two level protection system.

The first level of protection is provided by the worker's insulating gloves and sleeves. This system is intended to protect the worker from intentional and unintentional direct contact with energized conductors, specifically those being worked on. The second level of protection is provided by cover up materials including blankets, line hose, hoods and other barriers, it also includes the boom of an insulating aerial platform. This system is intended to protect the worker from intentional and unintentional contact with the ground or an energized or grounded conductor or equipment other than that which will be directly worked on.

The worker will be in one of three positions when working on or near an energized conductor:

- Working on the energized conductor or equipment
- Working within reach but not on the energized conductor or equipment
- Working within the zone (reach plus minimum approach) but not within reach

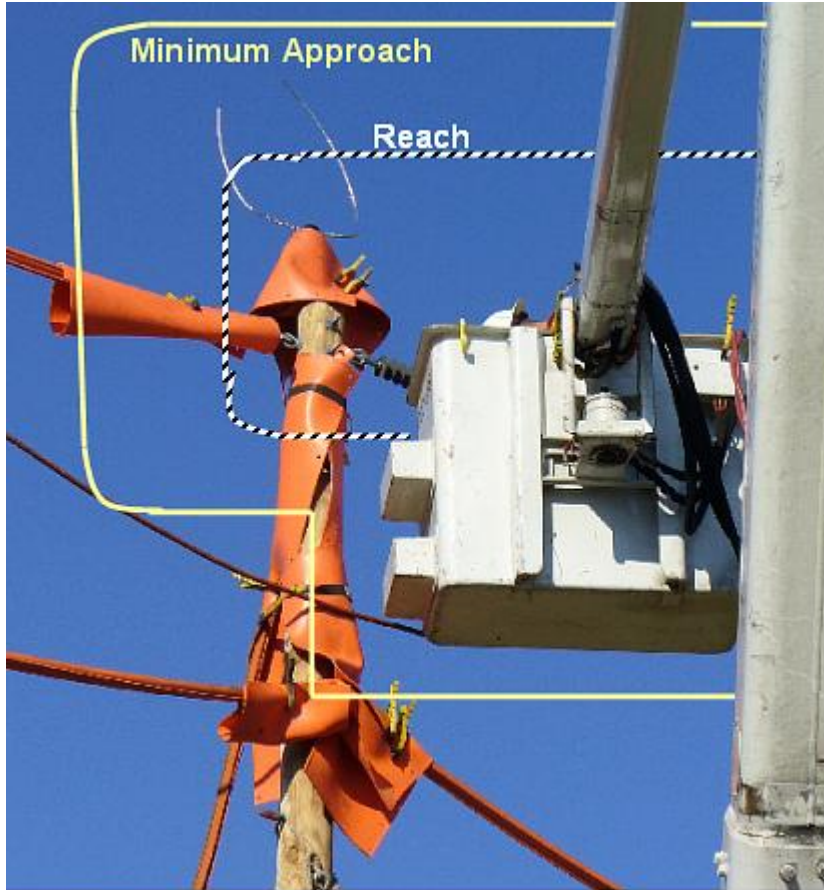
The worker is required to provide himself with appropriate protection depending upon the position he will be required to take to perform his assignment.

2) Discussion:

The following are the levels of protection / cover up required depending upon position when working using the insulating gloves method (these are additive requirements as you move to the higher levels of protection):

- **Worker is not working on energized equipment and is working in the zone (reach plus minimum approach) but not within reach of energized conductors or equipment** - the worker must wear insulating gloves and sleeves of the appropriate class for the primary voltage they are working near, cover up is not required.
- **Worker is not working on energized equipment but is working in the zone and within reach of energized conductors or equipment** - all energized conductors and equipment within reach of the worker must be covered.
 - When covering with conventional cover up materials, the worker will be working hands on, therefore, conductors and equipment at ground or neutral potential within reach plus minimum approach of the worker or within minimum approach of the bucket must also be covered. If hard cover of the appropriate class can be applied with hot line tools and all energized conductors and equipment within reach are fully covered, it is not necessary to cover these grounded conductors
- **Worker is working on energized conductors or equipment** - Cover up must be applied to all energized conductors and equipment and all conductors and equipment at ground or neutral potential within reach plus minimum approach of the worker or within minimum approach of the bucket.
 - Poles, cross arms, wooden braces and other hardware that may come in contact with primary voltages (i.e. tie wire) must be covered.

The zone of protection for the worker is shown below:



3) Definitions:

Working on: The worker or a conductive object in the worker's hand has to make direct contact with the energized conductor or equipment being worked on.

Working within reach: The worker or a conductive object in the worker's hand can reach the energized conductor or equipment from the worker's position even though the worker does not intend to contact that conductor or equipment.

Working within the zone: The worker or a conductive object in the worker's hand can reach within the minimum approach distance of the energized conductor or equipment from the worker's position even though the worker does not intend to contact that conductor or equipment.

4) Safety / OSHA Manual References:

AEP Safety Manual:

E1.03 - When an employee is required to go, reach, or take any conductive object within the minimum approach distances from any energized conductor or equipment, the employee shall be properly protected. Reference Electrical Table 1.03

E1.11 – Working NEAR and NOT ON

1.11.1. WORKING ON (with other equipment **NEAR**)

When working on energized conductors and equipment over 1,000 volts and minimum approach distances specified in Electrical Table 1.03 cannot be maintained to energized equipment not being worked on, appropriate barriers or cover-up shall be applied to that equipment. Other non-energized components within reach shall be covered as well.

1.11.2. WORKING NEAR (**NOT ON**)

When working within reach of lines or equipment energized from 1000 to 34,500 volts, and minimum approach would be violated, each worker shall use insulating protective equipment (cover up) to cover those energized parts within reach. Employees shall also use PIPE as specified in Electrical Rule 2.01 and Electrical Table 2.01.

E2.17 – If employees must reach or pass through energized conductors and equipment and the distances specified in Electrical Table 1.03 cannot be maintained, those conductors and equipment must be first covered with approved Insulated Protective Equipment (IPE).

E2.18 - Secondary circuits, guy wires, ground wires, neutral wires, telephone lines, and similar attachments in close proximity at the work area shall be covered with approved Insulated Protective Equipment (IPE).

OSHA Regulations:

1910.269(1)(2)

"Minimum approach distances." The employer shall ensure that no employee approaches or takes any conductive object closer to exposed energized parts than set forth in Table R-6 through Table R-10, unless:

1910.269(1)(2)(i)

The employee is insulated from the energized part (insulating gloves or insulating gloves and sleeves worn in accordance with paragraph (1)(3) of this section are considered insulation of the employee only with regard to the energized part upon which work is being performed), or

1910.269(1)(2)(ii)

The energized part is insulated from the employee and from any other conductive object at a different potential, or

National Electric Safety Code:

NESC Rule 441:

Employees shall not approach or knowingly permit others to approach, any exposed ungrounded part normally energized except as permitted by this rule.

A) Minimum approach distance to live parts

1. General

Employees shall not approach or bring any conductive object within the minimum approach listed in Table 441-1 to exposed parts unless one of the following is met:

- a. The line or part is de-energized and grounded per Rule 444D.
- b. The employee is insulated from the energized line or part. Electrical protective equipment insulated for the voltage involved, such as tools, gloves, rubber gloves, or rubber gloves with sleeves, shall be considered effective insulation for the employee from the energized part being worked on,
- c. The energized line or part is insulated from the employee and from any other part at a different voltage
- d. The employee is performing bare hand live-line work according to Rule 446.

2. Precautions for approach – Voltages from 51 V to 300 V

Employees shall not contact exposed energized parts operating at 51 V to 300 V, unless the provisions of Rule 441A1 are met.

3. Precautions for approach – Voltages from 301 V to 72.5 kV

At voltages from 301 V to 72.5 Kv, employees shall be protected from phase to phase and phase to ground differences in voltage. See Table 441-1 for the minimum approach distances to live parts.

- a. When exposed grounded lines, conductors, or parts are in the work area, they shall be guarded or insulated.
- b. When the Rubber Glove Method is employed, rubber insulating gloves, insulated for the maximum use voltage as listed in Table 441-6, shall be worn whenever employees are within the reach or extended reach of the minimum approach distances listed in Table 441-1, supplemented by one of the following two protective methods:
 - (1) The employee shall wear rubber insulating sleeves, insulated for the maximum use voltage as listed in Table 441-6, in addition to the rubber insulating gloves.
 - (2) All exposed energized lines or parts, other than those temporarily exposed to perform work and maintained under positive control, located within maximum reach of the employee's work position, shall be covered with insulating protective equipment.
- c. When the Rubber Glove Work Method is employed at voltages above 15 Kv phase-to-phase, supplementary insulation (e.g., insulated aerial device or structure-mounted insulating work platform), tested for the voltage involved shall be used to support the worker.
- d. Cover-up equipment used to insulate the phase-to-phase exposure shall be rated for not less than the phase-to-phase voltage of the circuit(s) in the work area. All other cover-up equipment shall be rated for not less than the phase-to-ground voltage of the circuit(s). The determination of whether phase-to-phase or phase-to-ground exposure exists shall be based on factors such as but not limited to: work rules, conductor spacing, worker position, and task being performed.
- e. Cover-up equipment, when used, shall be applied to the exposed facilities as the employee first approaches the facilities from any direction, be that from the structure or from an aerial device, and shall be removed in the reverse order. This protective cover-up shall extend beyond the reach of the employee's anticipated work position or extended reach distance.