

## Work Practice - Rubber Gloving and Working on De-energized 34.5 kV Circuits

**Please review and share within 5 business days**

### Work practice for working on de-energized 34.5 kV circuits:

- Establish a zone of protection by requesting the appropriate Clearance or Controllership;
- De-energize the circuit by isolating all known sources of potential using a rated live-line tool (hot stick) and Class 2 gloves;
- Test the circuit with a live-line tool and potential tester to verify that it is de-energized;
- Install 2/0 equipotential grounds for personal protection and a cluster bar in accordance with Eversource grounding procedures at the work location;
- Perform work using Class II rubber gloves, rubber sleeves (sleeves not required after an equipotential zone (EPZ) is created), FR clothing, hard hat, safety eyewear, EH rated footwear and fall protection.

### Discussion:

Per current Eversource safety rules, the class of rubber gloves that are used when performing work on energized circuits is determined by the system operating voltage of the circuit. Eversource Safety rules require Class II rubber gloves to be worn when rubber gloving energized circuits up to and including 23,000 volts phase to phase (13,200 phase to ground), which aligns with OSHA regulations. Class II rubber gloves are rated at 17,000 volts (phase to ground).

Eversource safety rules also require the use of Class II rubber gloves while using rated live-line tools (hot sticks). In those cases, the rated live-line tool is the primary protection. This requirement is more conservative than OSHA regulations, which does not mandate the use of rubber gloves in this situation.

Eversource safety rules also requires the use of Class II rubber gloves in situations where crews have created a de-energized and equipotentially grounded zone of personal protection (EPZ). This requirement is more conservative than OSHA requirements, which does not mandate the use of rubber gloves in this situation. In addition, when Class 2 rubber gloves are used for working on conductors whose normal operating system voltage is 34.5 kV AND that have been grounded for personal protection in accordance with Eversource procedures, all known sources of potential feeding the work area shall be isolated, tagged and controlled following the Eversource DNO Clearance procedure.

Crews can take more conservative measures if conditions warrant, including lifting taps on all transformers in the zone if needed.

### Q&A:

#### Question 1:

Will non PSNH crews be required to rubber glove energized 34.5 kV?

#### Answer 1:

No, CT, WMA and EMA line workers are not trained or equipped to rubber glove the 34.5 kV system. All 34.5 kV work will be done with tested live line tools (hot sticks) and Class 2 gloves if energized OR de-energized, dead and EPZ grounding. CT, WMA and EMA line crews will NOT be asked or assigned to rubber glove 34.5 kV.

#### Question 2:

Are transformers considered a known source of potential?

#### Answer 2:

No, transformers are not considered a known source of potential, ONLY after a successful test for potential and EPZ grounding.

**Question 3:**

Are bracket grounds considered EPZ grounds?

**Answer 3:**

No, a cluster bar, grounds and bonds must be utilized to put workers at the same potential. Workers are safe as long as they work within the equipotential zone.

**Question 4:**

Is neutral voltage the same as system voltage?

**Answer 4:**

No, the neutral is generally around ground potential, however, the neutral does have the potential to become energized at system voltage during a fault condition, as it is the return path. Insulate and isolate measures must always be applied to the neutral during work activities.

**Question 5:**

Is there a common neutral on dual circuits and / or overbuilt with different voltages?. Do we bond both circuits to common neutral and ground everything on the pole?

**Answer 5:**

Yes, Design standards require the same neutral to be bonded together, except for delta. Down grounds are typically installed at a minimum of 4 per mile as per NESC, with equipment grounded at each location (transformer, switch, cap bank, etc.).

**Question 6:**

Can 1/0 grounds be paired to equal 2/0 capacity?

**Answer 6:**

No, unless the grounds have the exact same resistance, impedance etc. Eversource crews will use only 2/0 grounds when working on 34.5 kV.

**Question 7:**

How do you create visible breaks with ampac connectors?

**Answer 7:**

Ampac connectors are not to be used as isolation points, workers will have to go to the next upstream device. Engineering recommends installing inline switches as main points of isolation.

**Question 8:**

Can the S&C 5400 Series Portable Loadbreak tool work on a 34.5 kV fuse?

**Answer 8:**

Yes, the S&C 5400 Series Portable Loadbreak tool is rated for 25/34.5 kV nominal and 38 kV maximum.

**Question 9:**

Do you always have to de-energize the under-build when working the top?

**Answer 9:**

It depends on the conditions and site assessment. If you can't maintain appropriate clearance for the voltages, you will have to de-energize and ground (same practice as the 27.6 over-build design). If the under-built is affected but not the 34.5 kV AND MAD can be maintained and covered, you can leave the 34.5 kV energized.

**Question 10:**

How can I safely work a 34.5 kV conductor on the ground with Class II gloves?

**Answer 10:**

Handling of normally energized primary conductors from the ground shall be done with a live-line tool, unless the conductor is effectively grounded. If using live line tools is not feasible, ensure the conductor is isolated from all sources of potential with a visible break, splice on the ground and hoist into position.

**Thank you for your commitment to Safety First and Always**