



## **BEST PRACTICE: INSULATE & ISOLATE**

### **SUBJECT: I&I TECHNIQUES FOR THE LIVE LINE TOOL METHOD ON DISTRIBUTION.**

**PRACTICE STATEMENT:** The effective use of Isolate and Insulate equipment and procedures to provide the necessary level of safety when performing Live Line Tool work on energized lines & equipment.

The employer must ensure that any employee who performs energized line work is qualified (See 29 CFR 1910.269 and 29 CFR 1926.950) through training and experience to perform the work assigned.

**PRACTICE DESCRIPTION:** Properly performed Insulate and Isolate (I&I) techniques used in conjunction with the necessary insulating live line tools allows qualified personnel to safely work on and around energized equipment and conductors.

#### **I&I Definitions:**

1. **Insulated:** (1) The use of Insulated Protective Equipment (IPE) to protect the line worker while working on or within 5 foot (including extended reach) of energized lines/equipment.
2. **Insulating Personal Protective Equipment (IPPE):** Rubber Gloves and Sleeves.
3. **Insulating Protective Equipment (IPE):** rubber blankets, rubber line hose, rubber hoods, plastic covers, etc.
4. **Isolate:** (A) Physically separated, electrically and mechanically, from all sources of electrical energy. Such separation may not eliminate the effects of induction. (B) Not readily accessible to persons unless special means for access are used.
5. **Minimum Approach Distance (M.A.D.):** The distances set forth in 29 CFR 1910.269. This distance is measured from the end of the line workers reach or from the end of any conductive object being handled by the line worker.
6. **Second points of contact:** Accidental/inadvertent contact made with any conductive object within your extended reach that could have a difference of potential and would allow current to pass through the body.

#### **I&I Best Practice: Energized Primary Live Line Tool Method**

1. Only workers who are qualified shall be permitted to work within M.A.D. using this best practice.
2. When working from an aerial lift/structure the 'IPPE for the Live Line Tool Method on Distribution Lines' Best Practice shall be observed. Any time an employee's unprotected

hands and/or arms are positioned within the MAD of exposed energized lines or equipment, appropriately rated rubber gloves and sleeves shall be worn or effective cover shall be applied.

3. Before getting into a position where the qualified line worker can reach into, extend any conductive object into, or extend any other part of the body into the M.A.D., approved and tested IPE/IPPE for the voltage to be worked shall be used to insulate/isolate energized conductors and/or other conductive parts at a different potential.
4. For URD equipment the criteria for the 'Lock to Lock' Best Practice shall be observed.
5. Approved IPE shall be installed in the order of 'nearest first' and removed in the reverse order.
  - a. Energized or de-energized part(s) may have to be temporarily covered in order to install IPE on all parts necessary to insulate/isolate the part that is to be worked on.
  - b. The part to be worked shall only be uncovered after all IPE has been installed in the work zone that will allow no contact with conductors or equipment at a different potential.
  - c. IPE shall be installed/removed in such a manner so that the worker is not exposed to contact from energized conductors or second points of contact.
  - d. The line worker shall **NEVER** turn their back on exposed energized conductors or second points of contact within M.A.D.

#### **BENEFITS:**

- Eliminate contact injuries.
- Eliminate electric arc flash injuries.
- Safely working on energized circuits and maintaining the reliability of the electrical system.

#### **REFERENCES:**

- **NJATC** – Effective Cover Up; interactive training.
- **NECA** – Safety Risk Management for the Electrical T&D Line Construction
- **IBEW** – Ten States Safety Manual
- **OSHA** – 1910.269, 1926.950; subpart V
- **ASTM** – F 968-93
- **ET&D Partnership** – Existing Best Practices
- **WISHA-296-45** – Electrical Workers
- **IEEE 100** – The Authoritative Dictionary of IEEE Standards Terms (seventh edition)

#### **Frequently Asked Question**

1. What training and skills must a qualified person (qualified line worker) possess?

A: OSHA 29 CFR 1910.269(a)(2)(i) states:

Employees shall be trained in and familiar with the safety-related work practices, safety procedures, and other safety requirements in this section that pertain to their respective job assignments. Employees shall also be trained in and familiar with any other safety practices, including applicable emergency procedures (such as pole top and manhole rescue), that are not specifically addressed by this section but that are related to their work and are necessary for their safety.

OSHA 29 CFR 1910.269(a)(2)(ii) qualified persons shall also be trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment,
- The skills and techniques necessary to determine the nominal voltage of exposed live parts,
- The minimum approach distances specified in this section corresponding to the voltages to which the qualified employee will be exposed, and
- The proper use [and selection] of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment.

2. Does M.A.D. apply when using a live line tool?

A: YES.

3. What voltage separates distribution voltage from transmission voltage?

A: According to the definition set forth by IEEE 100 7<sup>th</sup> Edition: Electric power lines which distribute power from a main source substation to consumers, usually at a voltage of 34.5KV or less.

4. I am performing “Hot stick” work and need to encroach M.A.D. and perform a task by hand. What position do I need to be in to don my rubber insulating gloves and sleeves?

A. Performing “Hot Stick” work method does not require the use of rubber insulating gloves or gloves and sleeves. If during this operation a task requires the worker to enter into M.A.D, rubber insulating gloves and /or gloves and sleeves shall be donned prior to encroaching the applicable M.A.D. The worker shall maintain or move to a safe position so not to encroach M.A.D. during the donning of the PPE.