All changes to TD procedures are controlled by TD 001 “Writing, Revising, and Publishing Transmission and Distribution Procedures”.

This procedure replaces and supersedes the following procedures (in whole or in part), as described in Section 3 “Summary of Changes”:

- none

Roll Out Instructions:
Prior to initial use of this procedure, each individual using this procedure is required to attend training on this procedure delivered during Bi-Monthly Safety Meeting or similar.

**Approvals:**

**CL&P:**
Name: Richard R. Kiddy  
Title: Director - Maintenance (CL&P Energy Delivery Services)

**WMECO:**  
Name: N/A  
Title: N/A

**PSNH:**  
Name: N/A  
Title: N/A

**Transmission Business:**
Name: Kenneth B. Bowes  
Title: Director - Transmission Maintenance

Procedure applicable only to NU companies for which an approval signature appears above.

**NU Occupational Safety & Health Services:**
Name: John J. Dugan  
Title: Director - Occupational Safety & Health Services (NU)

Changes to this procedure require approval of NU Occupational Safety & Health Services.
TABLE OF CONTENTS

1. INTRODUCTION ...................................................................................................................3
   1.1 Objective .........................................................................................................................3
   1.2 Applicability ....................................................................................................................3
   1.3 References ........................................................................................................................4
   1.4 Discussion ........................................................................................................................5
   1.5 Parts and Materials ...........................................................................................................6

2. INSTRUCTIONS .....................................................................................................................7
   2.1 Daily Inspection, Care, and Use of Live-Line Tools ......................................................7
   2.2 Two Year Inspection and Maintenance ...........................................................................9

3. SUMMARY OF CHANGES .................................................................................................12

ATTACHMENTS

Attachment 1 Definitions........................................................................................................13
Attachment 2 Live-Line Tool Protective Integrity and Inspection Label.............................14
Attachment 3 Flow Chart – Live-Line Tool Two Year Inspection and Maintenance........15
1. INTRODUCTION

1.1 Objective

This procedure provides instructions for the use, care, maintenance, two-year inspection and refurbishment of fiberglass reinforced plastic (FRP) live-line tools (i.e., hot sticks):

Compliance with these instructions will help:

- Enhance worker safety
- Ensure compliance with OSHA regulation 29 CFR 1910.269(j)(2) for daily maintenance and 2 year inspection

Wooden live-line tools are prohibited for use on live or de-energize lines or equipment.

1.2 Applicability

Applies to live-line tools constructed as follows:

- Fiberglass reinforced plastic (FRP) rod
- Foam-filled FRP tube
- Hollow FRP tube (i.e., telescoping, “extendo”)

Applies to personnel:

- Who use live-line tools for primary protection from electrical hazards
- Performing refurbishment and two-year inspection of live-line tools

Minimum qualifications to use this procedure:

- Daily use, maintenance, and inspection:
  - Journeyman Linemen
  - Journeyman Electrician
  - Helper under direction of a Journeyman Lineman or Journeyman Electrician
- Two-year inspection and maintenance:
  - Journeyman Linemen
  - Journeyman Electrician
  - Helper under direction of a Journeyman Lineman or Journeyman Electrician
  - Qualified NU equipment tester
  - Certified Testing Laboratory

---

1 29 CFR 1910.269(j)(2)
1.3 References

Unless otherwise specified:

- Procedures are available in
  - Document Control database in Lotus Notes

Development References
Documents used to develop this procedure and the process it controls:


Supporting References
Documents that support performance of activities directed by this procedure:

- Stock code 435061 - “Live-Line Tool Inspection” label
- The Connecticut Light and Power Accident Prevention Manual Section 2.16 “Rubber Gloves, Sleeves, and Other Insulating Protective Equipment”

Supporting Programs and Databases
Programs and databases that support performance of activities directed by this procedure:

- none
1.4 Discussion

Procedure Sections are written to supplement user knowledge. References to other procedures are provided for user aid. Referenced forms, tags, labels, and database inputs must be completed.

By design, **live-line tools** (such as hot sticks) help keep energized parts at the minimum approach distance from personnel and other possibly conductive items. Maximum insulating qualities of FRP hot sticks are best retained through careful maintenance, storage, and use to preserve a waxed, glossy smooth surface as this minimizes surface wetting by water (i.e., water beads up, does not cover tool with a thin conductive film).

Users are **ultimately responsible** for the protective qualities of **live-line tools**. Users are also the 1st line of defense for identifying tools whose protective qualities have been compromised, and removing those tools from service.

OSHA regulation 10 CFR 1910.269(j)(2) requires the following for **live-line tools**:

(i) “each tool shall be wiped clean and visually inspected for defects before use each day”

(ii) “tool shall be removed from service for testing if an defect or contamination that could adversely affect protective properties”

(iii) “tools used for primary employee protection (such as hot sticks used by linemen) shall be removed from service every 2 years for examination, cleaning, repair and testing. Tools are to be tested at 75 kV per foot of length:

- after tool has been repaired or refinished
- after examination (if no repair or refinishing is performed) **unless** tool is made of FRP rod or foam filled FRP tube, **and** tool can be shown to have no defects that could cause tool to fail in use.

Only **live-line tools** constructed of FRP are permitted for use at NU.

**Use of wooden live-line tools on live or de-energized lines or equipment is prohibited.**

**Live-line tools** are considered to provide **primary protection** even where other **primary protection** is in use, such as rubber gloves and sleeves as required by CT-APM Section 2.16 "Rubber Gloves, Sleeves, and Other Insulating Protective Equipment”. This is because **live-line tools** can easily, and often do, contact the user in areas not protected by rubber gloves/sleeves, such as gripping a hot stick under an arm to obtain a better working position.

NU considers that FRP rod and foam-filled **live-line tools** successfully passing electrical inspection (using an approved portable tester), demonstrates that the tool has “no defects that could cause it to fail during use”. Therefore, the OSHA 1910.269(j)(2)(iii)(C) requirement for 75 kV/foot electrical testing every 2 years per 1910.269(j)(2)(iii)(D) and (E) is waived, as allowed by 1910.269(j)(2)(iii)(C)(2), unless tool serviceability is suspect or tool has been refurbished (repaired or refinished).

To clarify, the following always require a 2-year 75 kV/foot electrical test, and are not eligible for the 1910.269(j)(2)(iii)(C)(2) waiver:

- Hollow tube tools
- Tools which have been refurbished (repaired, refinished)
1.5 Parts and Materials

The following items support the activities of this procedure.

<table>
<thead>
<tr>
<th>Stock code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0133909</td>
<td>Wax, carnuba, hot line tools</td>
</tr>
<tr>
<td>0133951</td>
<td>Cleaner, all-purpose, hot line tools and aerial booms</td>
</tr>
<tr>
<td>0187610</td>
<td>Cloth, wiping hot stick</td>
</tr>
<tr>
<td>0189739</td>
<td>Cleaning, kit, refinishing, live-line tools</td>
</tr>
<tr>
<td>0189741</td>
<td>Pad, abrasive, cleaning, hot stick</td>
</tr>
<tr>
<td>0191049</td>
<td>Kit, restorer gloss</td>
</tr>
<tr>
<td>0192977</td>
<td>Solvent, cleaning moisture eater, hot line tools</td>
</tr>
<tr>
<td>0401017</td>
<td>Tester, hot-stick, 115v</td>
</tr>
<tr>
<td>0435061</td>
<td>“Live-Line Tool Inspection” label</td>
</tr>
</tbody>
</table>

Approval as follows is required for all parts and materials used for live-line tool maintenance and inspection.

CL&P - Distribution Construction Methods and Procedures
(CL&P Customer Operations, Operations Support)

Transmission Business - Transmission Training and Methods
(Technical Support, Transmission Maintenance)
2. INSTRUCTIONS

Section 1.5 contains a listing of approved parts and materials needed to perform the activities described in this procedure.

2.1 Daily Inspection, Care, and Use of Live-Line Tools

**WARNING**

Wooden **live-line tools** are prohibited for use on live or de-energized lines or equipment.

Improper maintenance and care of **live-line tools** may compromise insulating qualities, resulting in risk of injury or death.

- Users are expected to provide proper care and maintenance of tools at all times.
- Only cleansers specifically approved for cleaning **live-line tools** are permissible.
- Use of unapproved abrasive or soap detergent (liquid or powder) on tools may damage tool surface gloss or leave an ionizing residue, thereby compromising tools insulating qualities.

Use of **live-line tools** in no way excuses users from compliance with requirements of CL&P APM Section 2.16 “Rubber Gloves, Sleeves, and Other Insulating Protective Equipment”.

*Users of Live-Line Tools*

2.1.1 Each day, before initial use and after final use, PERFORM the following on each **live-line tool**:

a. If a telescoping tool, extend tool to longest length.

b. Using stock code 0187610 hot stick wiping cloth, WIPE tool clean.

c. If wiping cloth does **not** fully clean the tool, CLEAN tool with a clean absorbent cloth (no stock code) wetted with denatured alcohol or other approved cleanser

d. Refer to Attachment 2, and visually **INSPECT** tool for the following:

1) “Live-Line Tool Inspection” label properly completed and applied

2) Possible impairment of electrical insulating qualities or mechanical integrity of the hot stick

2.1.2 If any of the following, REMOVE tool from service and go to Section 2.2 “Two Year Inspection and Maintenance”.

- Indication of loss of protective integrity per guidance in Attachment 2

- “Live-Line Tool Inspection” label missing, loose, or is past inspection due date

---

2.1.3 During use, PROTECT live-line tools from damage and contamination, such as:
   • Placing tool on a clean tarp or cover in lieu of the ground
   • Handling tool to avoid abrasion by other tools and equipment

2.1.4 STORE live-line tools in bins or other storage area that protects the tools from damaging conditions or items, such as:
   • the elements  • sunshine  • abrasive surfaces
2.2 Two Year Inspection and Maintenance

Attachment 3 flowchart depicts a process flow for activities in this section.

All **live-line tools** used for personnel **primary protection** are required to be removed from service every 2 years for inspection.  

- Hollow FRP tube tools require 75 kV/foot electrical testing (or equivalent) every 2 years.
- Refurbished FRP rod or foam filled FRP tube tools require 75 kV/foot electrical testing (or equivalent).
- FRP rod or foam filled tools acceptable for use without refurbishing do not require 75 kV/foot electrical testing, provided inspection demonstrates that tool has no defects that could cause failure in use. The “electrical inspection using portable tester” discussed in step 2.2.4 b satisfies this provision.

**Users of Live-Line Tools, Qualified Equipment Testers, Certified Testing Laboratory**

2.2.1 Every 2 years, or as identified by Section 2.1 daily inspection, REMOVE **live-line tool** from service for the following maintenance and inspection.

2.2.2 CLEAN each **live-line tool** as follows:

a. If attached, REMOVE “Live-Line Tool Inspection” label.

b. Using stock code # 0187610 hot stick wiping cloth, WIPE tool clean.

c. If wiping cloth did not sufficiently clean tool, PERFORM the following:
   1) CLEAN tool using any of the following (listed by stock code):
      - 0133951 Cleaner, all-purpose, hot line tools
      - 0189741 Pad, abrasive, cleaning, hot stick
      - 0192977 Solvent, cleaning moisture eater, hot line tools
   2) Using stock code # 0187610 hot stick wiping cloth, WIPE tool clean.
   3) At inspector’s discretion, WAX tool using stock code 0133909 Carnuba wax.

---

3 10 CFR 1910.269(j)(2)(iii)
2.2.3 Refer to Attachment 2, and visually INSPECT each live-line tool thoroughly along its entire length for indications of possible impairment to electrical and mechanical integrity, such as:

- Damage or defects which penetrate glossed surface, including: cuts, scratches, abrasions, carbon tracking
- Contamination, such as: paint or markings, non-approved labels, residue
- Loss of surface gloss

**NOTE**

Determination of tool serviceability, refurbish ability, or removal from service is at inspectors discretion, subject to guidance by supervision/management.

Portable tester electrical inspection is used only to demonstrate that FRP rod and foam filled live-line tools has “no defects that could cause it to fail during use”. Electrical inspection does not negate requirement for 75 kV/foot electrical testing of the following:

- Hollow FRP tube tools every 2 years
- Refurbished FRP rod and foam filled tools

2.2.4 IF tool appears serviceable (contains no visual defects which require refurbishment or permanent removal from service), PERFORM the following, as appropriate:

a. If a hollow FRP tube tool, SUBMIT tool for 75kV/foot electrical testing, or equivalent.

b. If a FRP rod or foam filled tool, PERFORM portable tester electrical inspection as follows:
   1) OBTAIN as approved portable tester (such as stock code 0401017), and FOLLOW manufacturer’s instructions.
   2) If equipped, USE tester in “wet test” mode.
   3) INSPECT insulating integrity of tool along entire working length.
      - If tool is acceptable, go to step 2.2.6 to return tool to service.
      - If tool is not acceptable, SUBMIT for 75 kV/foot electrical test.

2.2.5 If tool requires, and is suitable for, refurbishment, SUBMIT tool for refurbishment, followed by 75kV/foot (or equivalent) electrical testing.

2.2.6 If tool is not serviceable and not suitable for refurbishment, permanently REMOVE tool from service, using one of the following actions:

- DESTROY tool (preferable)
- Permanently MARK tool to exclude use in the field (i.e., limit tool use for training purposes in a non-live electrical environment)
2.2.7 When tool is determined acceptable for use, PERFORM the following:
   a. COMPLETE stock code 0435061 “Live-Line Tool Inspection” label, to include the following minimum information:
      • Inspection date
      • Next inspection due date
      • Inspection conducted by
   b. Refer to sketch in Attachment 2, and AFFIX completed label to tool adjacent to “handle” end, wrapping the transparent portion of the label such that it covers and protects the information portion of the label.
   c. CLEAN or WAX fiberglass surface of tool, as follows:
      (either cleaning or waxing is required, however, both cleaning and waxing may be done, if desired):
      • WIPE with a clean hot stick wiping cloth, stock code 0187610.
      • APPLY carnuba wax, stock code 0133909.
   d. RETURN live-line tool to service.
3. SUMMARY OF CHANGES

Changes to TD Procedures are controlled by TD 001 “Writing, Revising, and Publishing Transmission & Distribution Procedures”.

Revision 0 - initial issue

Procedure written (as part of TD procedure upgrade project) to resolve various hot stick issues per direction of NU Occupational Safety and Health Services.
Attachment 1 Definitions
(Sheet 1 of 1)


Common words and terms having a specific definition applicable to this procedure (as defined below) are shown in [lower case underlined bold font](#) where used in this procedure.

**live-line tools** - non-conductive rods, tubes, and poles, such as hot sticks, designed to keep energized parts at the minimum approach distance from personnel and other possibly conductive items

**primary protection** – also “primary employee protection”, “primary personnel protection”.

Any Personnel Protective Equipment (PPE) or tool used to protect personnel from direct contact with an electrical hazard.

APM – Accident Prevention Manual

FRP - fiberglass reinforced plastic.
Indications of Loss of Protective Integrity

The following are typical indications of loss of electrical insulating qualities or loss of mechanical integrity of live-line tools. This list is not all-inclusive.

- Dirt, grease, or other contamination
- Tool cleaned using non-approved cleanser
- Improper storage or improper exposure to the elements
- Failure to pass insulating integrity test or 75 kV/foot electrical test
- Damage to the gloss surface, such as: cuts, scratches, nicks, gouges, dents, or de-lamination
- Mechanically overstressed tool showing evidence as damaged, bent, worn, or cracked components
- Electrically overstressed tool showing evidence of electrical tracking, burn marks, or blisters caused by heat


Inspection Label

“Live-Line Tool Inspection” label is typically installed on FRP shaft just above the “Handle” end of live-line tool, as shown below.
Attachment 3
Flow Chart – Live-Line Tool Two Year Inspection and Maintenance
(Sheet 1 of 1)

The specific instruction steps illustrated by this flowchart are contained in Section 2.2 “Two Year Inspection and Maintenance”.
(Note - tool refurbishment and 75kV/foot electrical testing is not within scope of this procedure.)