PPL companies

# AOP

**Electric APPROVED OPERATING POLICIES, Maintenance, and Inspection Plan**

**Subject**
Recloser Inspection

**OM&I Number**
EAOP-SI-004

**Effective Date**
October 1, 2018

**Policy**
**ELECTRIC DISTRIBUTION HYDRAULIC AND ELECTRONICALLY CONTROLLED RECLOSERS INSPECTION**

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## SECTION 1 – PURPOSE

This policy documents the inspection requirements for hydraulic and electronically controlled reclosers at Louisville Gas and Electric Company (LG&E) and Kentucky Utilities Company (KU). The inspection program is intended to identify, where possible, problems or potential problems that could have an adverse effect on safety, customer service and the orderly and efficient operation of the electric distribution system. It is structured to assure that assets are properly inspected, apparent deficiencies identified and documented, and records retained to ensure compliance with company procedures..

## SECTION 2 – SCOPE

2.1 This policy details the requirements for a periodic, ground-based inspection program for hydraulic and electronically controlled reclosers.

2.2 The objectives of the distribution system inspection program are to:

2.2.1 Enhance public safety and the safety of LG&E and KU employees and contractors by periodically inspecting all distribution hydraulic and electronically controlled reclosers for recognizable damage, defects and unsafe conditions.

2.2.2 Improve system reliability by identifying defective and damaged structures or equipment and other operating conditions which could result in outages or failures.

2.2.3 Provide documentation of inspections, deficiencies found and corrective actions taken.

2.2.4 Maintain compliance with the NESC regarding distribution inspections.

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**SECTION 3 – REFERENCES**

3.1 Kentucky Revised Statutes Chapter 278.042

3.2 Kentucky Administrative Regulations, Title 807 KAR 5:006, Section 26, Inspection of Systems.

3.3 Kentucky Occupational Safety and Health Act ("KOSHA").

3.4 LG&E and KU's Health & Safety Manual, Latest edition.

3.5 National Electrical Safety Code, Latest edition.

3.6 EOMI-SI-001-2017

**SECTION 4 – RESPONSIBILITIES**

4.1 Asset Management's Electric System Codes and Standards section shall have responsibility for revising and communicating the requirements of this policy. Revisions to this policy shall be reviewed and approved by the positions listed in Section 2.

4.2 At LG&E and KU, inspections for hydraulic and electronically controlled reclosers will be completed by utility personnel or contactors qualified to perform field inspections. The associated record keeping will be maintained by Operations Center personnel.

4.2.1 Records shall be stored electronically and paper copies filed and kept for the time prescribed in Section 11 – Record Keeping.

**SECTION 5 – DISCUSSION**

5.1 This policy and the KPSC regulations impose minimum standards for inspection frequency, inspection content and record-keeping requirements. Nothing in this document shall be construed as limiting: more frequent and more rigorous inspections and more stringent record requirements will be at the discretion of the individual operations center.

5.2 Inspection methods, timing of inspections and labor resources (utility personnel/contractor) utilized to complete inspections may vary by center provided they meet the minimum requirements contained in this document.

**SECTION 6 – POLICY**

6.1 Inspection Frequency for Hydraulic and Electronically Controlled Reclosers

6.1.1 At intervals not to exceed one year:

a) Hydraulic reclosers

6.1.2 At intervals not to exceed two years:

a) Electronically controlled reclosers. The inspection for these controllers will be completed bi-annually in conjunction with the inspection requirements outlined in EOMI-SI-001-2017

6.1.3 Upon receipt of any report of a potentially hazardous condition all portions of the system which are the subject of the report shall be inspected as soon as practical.

6.2 Intent of Inspections

6.2.1 Inspections will be completed by utility personnel or contractors qualified to perform field inspections.

6.2.2 The intent of the inspection is to perform a detailed technical assessment of each component, of every recloser, where possible, and visually inspect for apparent unsafe conditions, while identifying damaged

and defective equipment and other operating conditions that may affect system reliability or safety. A listing of items commonly checked during inspections can be found in the Appendix of this document.

6.2.3 Distribution Hydraulic and Electronically Controlled Reclosers

6.2.3.1 The inspection of hydraulic and electronically controlled reclosers will consist of a ground (via foot or vehicle) based visual inspection. The most effective method to achieve this requirement will be determined by the Operations Center based on the characteristics of the recloser being inspected. Aerial inspections shall not be used as the basis for compliance.

6.2.3.2 Hydraulic and electronically controlled reclosers placed on foreign owned structures will be inspected to the same extent as facilities on the utility's own structures. It is not the responsibility of the utility to inspect foreign owned structures, lines or equipment. However, defects or structural deficiencies with foreign owned structures and attachments identified during routine inspections will be reported to the facility owner whenever such deficiencies could have a detrimental impact on safety or operation of either of the utilities' lines and equipment. Any such deficiencies shall be documented in the same manner as deficiencies on the utility's own structures and tracked in the same manner until all deficiencies have been corrected.

**SECTION 7 - SAFETY**

7.1 Personnel performing the duties related to system inspection shall perform the necessary tasks in a safe manner and in compliance with company and departmental Safety Manuals, procedures and policies using the required Personal Protective Equipment (PPE). Special attention will be directed to the hazards related to terrain, insects, snakes, other animals, plants, and vehicular hazards.

**SECTION 8 – ENVIRONMENTAL**

8.1 Oil-filled equipment found to be passively leaking will be noted as part of the inspection process. Equipment found to be actively leaking requires immediate notification of the appropriate company department(s) so that compliance with utility oil spill response procedures can be assured.

**SECTION 9 – TRAINING AND QUALIFICATIONS**

9.1 All inspectors must be knowledgeable of company Safety Manual, safety policies and procedures and have a working knowledge of the NESC as it applies to the facilities being inspected. Recloser inspectors shall have complete familiarity with the construction and operation of distribution lines, equipment and structures as well as a working knowledge of company construction standards.

**SECTION 10 – EQUIPMENT**

10.1 Inspectors shall be equipped with and qualified in the use of all PPE appropriate for the work and facilities being inspected.

10.2 Inspectors shall carry a cellular phone and/or a company radio at all times while performing inspection work suitable for contacting the appropriate emergency response personnel in the event of an emergency or appropriate company personnel in the event an active oil leak or potentially dangerous condition is found during the course of inspection.

**SECTION 11 – RECORD KEEPING**

11.1 Records of Inspection – Hydraulic and Electronically Controlled Reclosers

11.1.1 Hydraulic and Electronically Controlled Reclosers inspections must be performed so that inspection forms can be properly completed. There are separate forms for hydraulic reclosers and electronically controlled reclosers. See examples of these forms in the appendix of this document.

11.1.2 Each inspection record must contain the inspector's name and the completion date of the inspection.

11.1.3 The completed inspection forms will be given to the Recloser Inspection Coordinator at each Operations Center. The inspection results will be entered into Cascade, the electronic equipment database. The paper inspection forms will be filed and stored for a minimum of 3 years.

11.1.4 Work orders will be created for deficiencies found during inspections. Work orders are to be generated in Asset and Resource Management (ARM) with a unique Work Request (WR) number

11.1.5 Inspection completion and WR generation is the responsibility of the Recloser Inspection Coordinator at each Operations Center.

11.2 Documentation – Hydraulic and Electronically Controlled Reclosers

11.2.1 Each Operations Center shall retain the originals of the inspection forms for their areas.

11.2.3 When a defect, deficiency, or other condition is found that poses an imminent hazard to safety or customer service, the inspector must immediately notify (by phone or radio) the appropriate department for corrective action. If the condition represents a present safety hazard to customers or to the general public, such as a live wire down, the inspector must guard the area until maintenance crews arrive to make the area safe.

***Appendix – Guidelines for Inspection and Inspection Forms***

**A.1.0 Guidelines for Distribution Hydraulic and Electronically Controlled Reclosers (conditions to be reported)**

A.1.1 All Reclosers

a) General
- ✓ External damage
- ✓ Broken or damaged
- ✓ Oil leaks
- ✓ Structurally damaging rust (does not include minor surface rusting)
- ✓ Bulged
- ✓ Overheating (discolored terminals or melted insulation)
- ✓ Flashed or broken bushings or terminals
- ✓ Not bolted securely to structure
- ✓ Blown fuses
- ✓ Blown lightning arresters
- ✓ Cutouts and switches not properly terminated and fully closed

b) Miscellaneous Support Brackets, and Hardware
- ✓ Flashed or broken
- ✓ Not securely bolted to structure
- ✓ Loose or missing hardware

c) Insulators
- ✓ Cracks, chips and signs of flashing/tracking
- ✓ Excessive dirt, soot or other possible contamination
- ✓ Improper insulator attachment (suspension insulators are properly attached to pole, crossarm or other support, pin insulators are properly seated on pin or secured to support arm, pole, etc.) Conductor improperly secured to insulators (conductor floating)

A.1.2 Electronically Controlled Reclosers

a) Controller Box
- ✓ External damage (vehicles, vandals, etc.)
- ✓ Objectionable graffiti
- ✓ Damaged or missing lock
- ✓ Holes (screw holes, bolt holes, rust holes, etc.)
- ✓ Errors or warning on display (if applicable)
- ✓ Wild life infiltration

**A.2.0 Forms**

A.2.1 Hydraulic Recloser Inspection Form (see below)

A.2.2 Electronically Controlled Recloser Inspection Form (see below)

**Hydraulic Recloser Inspection Form**

HYDRAULIC RECLOSER DATA

DATE_____ EMPLOYEE _____ SUBSTATION _____

CIRCUIT NO _____ TLM # _____
RECLOSER LOCATION _____
A Φ # _____ SIZE _____ TYPE ____ Readings -- OC_____ PRESENT_____
B Φ # _____ SIZE _____ TYPE ____ Readings -- OC_____ PRESENT_____
C Φ # _____ SIZE _____ TYPE ____ Readings -- OC_____ PRESENT_____
REMARKS _____

CIRCUIT NO _____ TLM # _____
RECLOSER LOCATION _____
A Φ # _____ SIZE _____ TYPE ____ Readings -- OC_____ PRESENT_____
B Φ # _____ SIZE _____ TYPE ____ Readings -- OC_____ PRESENT_____
C Φ # _____ SIZE _____ TYPE ____ Readings -- OC_____ PRESENT_____
REMARKS _____

CIRCUIT NO _____ TLM # _____
RECLOSER LOCATION _____
A Φ # _____ SIZE _____ TYPE ____ Readings -- OC_____ PRESENT_____
B Φ # _____ SIZE _____ TYPE ____ Readings -- OC_____ PRESENT_____
C Φ # _____ SIZE _____ TYPE ____ Readings -- OC_____ PRESENT_____
REMARKS _____

CIRCUIT NO _____ TLM # _____
RECLOSER LOCATION _____
A Φ # _____ SIZE _____ TYPE ____ Readings -- OC_____ PRESENT_____
B Φ # _____ SIZE _____ TYPE ____ Readings -- OC_____ PRESENT_____
C Φ # _____ SIZE _____ TYPE ____ Readings -- OC_____ PRESENT_____
REMARKS _____

CIRCUIT NO _____ TLM # _____
RECLOSER LOCATION _____
A Φ # _____ SIZE _____ TYPE ____ Readings -- OC_____ PRESENT_____
B Φ # _____ SIZE _____ TYPE ____ Readings -- OC_____ PRESENT_____
C Φ # _____ SIZE _____ TYPE ____ Readings -- OC_____ PRESENT_____
REMARKS _____

**Electronically Controlled Recloser Inspection Form (page 1)**

Electronic Recloser Annual Inspection Form

Job ID/WR# _____ Inspector _____

Date _____ Circuit _____

Recloser Asset Number _____ TLM# _____

Recloser Control Asset Number _____

Recloser Control Type SEL ☐ Cooper Form 6 ☐

Address _____

**LAMP TEST**

| SEL | Cooper Form 6 |
|---|---|
| When actuated, all front panel LED's will illuminate for as long as you hold LAMP TEST key.<br>Verify the operating status of all indicator lights as follows:<br>1. Press and hold the LAMP TEST key | When actuated, all front panels LED's will illuminate for approximately 5 seconds.<br>Verify the operating status of all indicator lights as follows:<br>1. Press and hold the LAMP TEST key for two seconds on the main menu |

Are all indicator lights operational? YES ☐ NO ☐ Remarks: _____

**BATTERY TEST**

| SEL | Cooper Form 6 |
|---|---|
| Test the battery as follows:<br>*Can only perform this test 4 times in an hour per control<br>**AC power must be connected to perform test<br>1 Press Battery Test key on the front panel of device.<br>2. Battery Test light will blink for 10 seconds to indicate the test is running<br>3. Battery Test light will extinguish if battery passes voltage test, Battery Test light will remain illuminated if failed.<br>4. Battery Failed LED will illuminate on front panel if the battery has failed. | Test the battery as follows:<br>*Must wait 30 seconds after power up of control to perform<br>**AC power can either be connected or disconnected to perform<br>1. Press MENU button on front panel<br>2. Using the down arrow key, navigate to the BATTERY menu, and press ENTER<br>3. Using the down arrow key, navigate to the TEST BATTERY menu and press ENTER<br>4. Press the F4 button to test (Appears as - - - TESTING - - - on the display) |

Did the battery test fail or is the voltage less than 22V? YES ☐ NO ☐ Voltage _____

**OPERATIONS COUNTER**

| SEL | Cooper Form 6 |
|---|---|
| (Appears on LCD screen, scroll up and down to find "Oper Counter")<br>Displays the total number of trip operations and target operations<br>**DO NOT RESET COUNTERS** | (Appears as OPER COUNTER on LCD screen)<br>Displays the total number of trip operations and target operations<br>**DO NOT RESET COUNTERS** |

Number of trips per phase: AØ_____ BØ_____ CØ_____

**Electronically Controlled Recloser Inspection Form (page 2)**

**MAXIMUM DEMAND CURRENT**

| **SEL** | **Cooper Form 6** |
|---|---|
| 1. Push ENT to bring up main menu.<br>2. Scroll using up and down arrows to underline "Meter", push ENT<br>3. Scroll to underline "Demand", push ENT<br>4. Again, Scroll to underline "Demand" push ENT<br>5. Scroll and mark values for "IA Peak","IB Peak", "IC Peak", and "IG Peak."<br>Scroll down until you view the Demand Current. **RESET READING AFTER RECORDING** | (Metering on LCD screen)<br>Scroll down until you view the Demand Current. **RESET READING AFTER RECORDING** |

Current on Each Phase: AØ_____ BØ_____ CØ_____ GØ_____

**ALARM STATUS**

Are there active alarms on device (i.e. – Alarm lamp lit)? YES ☐ NO ☐

**STICKER/FILTER/LOCKS**

| | | | |
|---|---|---|---|
| Is there a DCC Sticker on the control box (SEL only)? | YES ☐ | NO ☐ | Remarks:_____ |
| Are all the filters changed (Cooper only)? | YES ☐ | NO ☐ | Remarks:_____ |
| Is the lock in its proper place? | YES ☐ | NO ☐ | Remarks:_____ |
| Is the lock labeled (Cooper only)? | YES ☐ | NO ☐ | Remarks:_____ |

**REMARKS (INCLUDE GENERAL VISUAL INSPECTION)**

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