

NOLIN RURAL ELECTRIC COOPERATIVE CORPORATION'S VEGETATION MANAGEMENT PROGRAM

Purpose is to improve the reliability of the electric distribution system by preventing outages from vegetation located on distribution rights-of-way and minimizing outages from vegetation located adjacent to rights-of-way, maintaining clearances between distribution lines and vegetation on and along distribution rights-of-ways.

Revised 9-10-24

Vegetation Management Program

Definitions of Terms

This section includes newly defined or revised terms used in this standard. New or revised definitions, listed below, become approved when the standard is placed in operation. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

Fire Risk: The likelihood that a fire will ignite or spread in a particular geographic area.

Flashover: An electrical discharge through air around or over the surface of insulation, between objects of different potential, caused by placing a voltage across the air space that results in the ionization of the air space.

IEEE: Institute of Electrical and Electronics Engineers, Inc.

Vegetation Inspection: The systematic examination of a distribution corridor to document vegetation conditions.

Operating Voltage: The voltage level by which an electrical system is designated and to which certain operating characteristics of the system are related; also, the effective (root-mean-square) potential difference between any two conductors or between a conductor and the ground. The actual voltage of the circuit may vary somewhat above or below this value.

Rated Electrical Operating Conditions: The specified or reasonably anticipated conditions under which the electrical system or an individual electrical circuit is intend/designed to operate.

Right-of-Way (ROW): A corridor of land on which electric lines may be located. The distribution owner may own the land in fee, own an easement, or have certain franchise, prescription, or license rights to construct and maintain lines.

Sustained Outage: The de-energized condition of a distribution line resulting from a fault or disturbance following an unsuccessful automatic reclosing sequence and/or unsuccessful manual reclosing procedure.

Distribution Line: A system of structures, wires, insulators and associated hardware that carry electric energy from one point to another in an electric power system. Lines are operated at voltages varying from 120 V up to 12 kV, and are capable of transmitting quantities of electricity over long distances.

Vegetation: All plant material, growing or not, living or dead.

Introduction

Purpose:

To improve the reliability of the electric distribution systems by preventing outages from vegetation located on distribution rights-of-way (ROW) and minimizing outages from vegetation located adjacent to ROW, maintaining clearances between distribution lines and vegetation on and along distribution ROW.

This standard is developed for all distribution lines operated at 12 kV and to any lower voltage lines designated by the Nolin Rural Electric Cooperative Corporation (RECC) as critical to the reliability of the electric system in the region.

Requirements:

- 1) Nolin RECC will periodically review, and keep current, the formal distribution vegetation management program. The review will include the evaluation of objectives, practices, approved procedures, work specifications, and evaluation of SAIDI, SAIFI, CAIDI, and CAIFI. The outage management system (OMS) will collect information from the advanced metering infrastructure (AMI) system, supervisory control and data acquisition (SCADA) and input from the on-duty dispatcher for evaluation.
- 2) The plan defines a schedule for ROW vegetation inspections. This schedule will be flexible enough to adjust for changing conditions. The inspection schedule is based on the anticipated growth of vegetation and any other environmental or operational factors that could impact the relationship of vegetation to the Nolin RECC's distribution lines.
- 3) Encourage public outreach to educate the public, in general, about the use and acceptance of vegetation management on rights-of-way.
- 4) Nolin RECC will, during initial installation, identify clearances between vegetation and any overhead, ungrounded supply conductors, taking into consideration the line voltage, the effects of ambient temperature on conductor sag under maximum design loading, the configuration and insulated value of the line, and the effects of wind velocities on conductor sway. Specifically, Nolin RECC will establish clearances to be achieved at the time of vegetation management work to maintain a set of clearances identified to prevent flashover between vegetation and overhead-ungrounded supply conductors. Nolin RECC shall determine appropriate clearance distances to be achieved at the time of distribution vegetation management work based upon: operating voltage, appropriate vegetation management techniques, fire risk, reasonably anticipated tree and conductor movement, species types and growth rates, species failure characteristics, local climate and rainfall patterns, line terrain and elevation, location of the vegetation within the span, and worker approach distance requirements.

- 5) Nolin RECC will determine specific radial clearances to be maintained between vegetation and conductors under all rated electrical operating conditions. These minimum clearance distances are necessary to prevent flashover between vegetation and conductors and may vary due to such factors as has been stated. Nolin RECC shall develop mitigation measures to achieve sufficient clearances for the protection of the distribution facilities when it identifies locations on the ROW where it is restricted from attaining the clearances specified in this Requirement.
- 6) All personnel directly involved in the design and implementation of the Vegetation Management Program shall hold appropriate qualifications and training, as defined by Nolin RECC, to perform their duties.
- 7) Nolin RECC shall establish a process for the communication of vegetation conditions that present an imminent threat of an outage to a distribution line. This is so action may be taken (temporary reduction in line's consumers, switching line out of service, etc.) until the threat is relieved.
- 8) Nolin RECC shall create and implement an annual plan for vegetation management work to ensure the reliability of the system. The plan shall describe the methods used, such as manual clearing, mechanical clearing, herbicide treatment, or other actions. The plan should be flexible enough to adjust to changing conditions, taking into consideration the anticipated growth of vegetation and other environmental factors that may have an impact on the reliability of the distribution systems. Adjustments to the plan shall be documented as they occur. The plan should take into consideration the time required to obtain permissions or permits from landowners or regulatory authorities. Each procedure for documenting and tracking the planned vegetation management work and ensuring that the vegetation management work was completed according to work specifications.

Compliance to the Requirements

1. The overall 'Vegetation Management Plan' will be evaluated annually to establish the progress of the plans' past year improvement against prior years. The comparison will include outage data of specific feeders, overall system outages, record keeping process of outage tickets, time response to outage lengths, comparison of funds to lines lengths and type of work done, and AMR's blink reports. Each year the progress of the plan will be evaluated; deviations, deficiencies or improvements will be made for the following year, and work procedures will be considered.

Right-of-Way clearing will be done on an approximate 5-year cycle. This schedule will be varied based on visual inspections and available outage indices on an individual circuit basis. Known trouble areas will be dealt with on an ad-hoc basis. Herbicidal treatments will be rendered, when applicable, in the growing year following mechanical clearing. Nolin will utilize its subsidiary, Wide Open Utility Service, and intermittent support from contracted personnel, to adhere to its Vegetation Management plan. Aerial trimming apparatus (Skytrims and bucket trucks), manual trimming crews, skid steer mounted forestry mulchers, and herbicide treatment crews will be used to achieve compliance with this plan.

2. An article describing the need for right of way maintenance, safety issues associated with live electric lines and trees, and proper tree selection for planting near electric lines will be periodically included in bill inserts, Kentucky Living magazine, and perpetually available on Nolin RECC's website. During System inspection, employees working on existing facilities will make calls to the dispatcher or General Foreman of Vegetation Management ("GF") about tree trimming or removal of trouble areas that may not comply with the RUS standard that is set forth in M1.30G "Right of way clearing guide" and standards set by the National Electrical Safety Code in Section 23. If no imminent danger exists, the dispatcher or GF will generate a Work Order Ticket for the correction of the problem.
3. Staking sheets will have notes associated for tree trimming or removal with dimensions from the centerline of the line construction. The notes will remain with the staking sheets throughout the construction phase and final inspection of the jobs. The dimensions will comply with the RUS standard that is set forth in M1.30G "Right of way clearing guide" and standards set in the National Electrical Safety Code in Section 23.
4. Employees will have annual training on the RUS standards and National Electrical Safety Code relating to line construction and safety issues.
5. The dispatcher will be available 24 hours a day to take calls, make work order tickets, and dispatch employees for imminent danger of hazards to the public.
6. An overall system map will be color coded for work to be done each year. The map will be a base for planning and an estimate for budget numbers. The cost of various methods of right of way control will be used as the land and environment dictate. Each year, during the planning period, an evaluation of outages and outages data will

be used to set an estimated budget number. During the Budget planning, a dollar figure will be set aside for the various methods of right of way control. The areas, as budget permits, will be designated as to method and length of lines to be done.