Ameren Missouri 20 CSR 4240-23.020 Electrical Corporation Infrastructure Standards Annual Inspection Report for Calendar Year 2021

Introduction

This document is Union Electric (dba Ameren Missouri) Company's annual report detailing its compliance with Missouri Public Service Commission Rule 20 CSR 4240-23.020, Electrical Corporation Infrastructure Standards (referred to in the remainder of this document as "the Rule"). This annual report is required by Section (3) (C) of the Rule which states, *"Each electrical corporation subject to this rule shall file…an annual report detailing its compliance with this rule during the prior calendar year…."* This report details the results of the infrastructure inspections conducted in calendar year 2021.

Definitions

For the purposes of this report, the following definitions shall apply:

1. Patrol – A simple visual inspection, of applicable electrical corporation equipment and structures, which is designed to identify obvious structural problems and hazards. Patrols may be carried out in the course of other electrical corporation business.
2. Visual Inspection – A careful visual examination of equipment and structures designed to identify structural problems, hazards, and defective or improperly operating equipment. Equivalent to "Detailed Inspection" as defined in Section (2) (B) of the Rule.
3. Ground Line Inspection – A complete intrusive inspection of overhead poles whereby the pole is excavated to a depth of 18 to 24 inches, tested for internal and external decay, treated with a preservative, and then backfilled. Equivalent to "Intrusive Inspection" as defined in Section (2) (C) of the Rule.
4. Overhead Equipment – Equipment used in the operation of the transmission and distribution system mounted on overhead poles including, but not limited to, conductors, transformers, fuses, switches, insulators, and lightning arresters.
5. Underground Pad-Mounted Equipment – Underground Residential Distribution (URD) system equipment including single phase and three phase pad-mounted transformers, pad-mounted switchgear, junction boxes, non-traffic rated vaults, and pedestals. Equivalent to "Underground-direct buried and conduit" and the equipment noted under Note 3 on the table entitled, "Electrical Corporation System Inspection Cycles (Maximum Intervals in Years)" included with the Rule.
6. Transmission System – That portion of the Ameren Missouri system operated at voltages of 100 kilovolts (kV) and above.
7. Distribution System – That portion of the Ameren Missouri system operated at voltages below 100kV.
8. Streetlights – Automatically controlled lighting for lighting of streets, alleys, walkways, and other thoroughfares open to and reserved for general public use when such lighting facilities are operated and maintained as an extension of Ameren Missouri's distribution system as described in Service Classification 5(M). This definition does not apply to lighting installed on public or private premises for the purpose of providing area or security lighting (i.e., "dusk-to-dawn" lights), customer-owned street and outdoor lighting as described in Service Classification 6(M), and incandescent municipal streetlighting or private streetlighting described under Service Classifications 7(M) and 8(M).

Transmission System Inspections

Ameren Missouri conducted inspections on its Transmission System during calendar year 2021 as required by Missouri Public Service Commission Rule 20 CSR 4240-23.020, Electrical Corporation Infrastructure Standards. The inspections conducted, as well as the deficiencies discovered and repaired as a result of these inspections, are described below.

Table 1
Transmission Circuits Inspected in 2021:

Inspection Type	Inspections Scheduled	Inspections Completed	Inspections Not Completed
"Patrol"	140	140	0
"Detailed"	10	10	0
Ground Line	10	10	0

The results of the lines inspected are summarized as follows:

Table 2
Results of Inspections

Component	Number Inspected	Number Requiring Repairs	%
Wood Poles	2,444	70	2.9%
Wood Structures	12,526	139	1.1%
Non-Wood Structures	5,409	0	0.0%
Conductors*	17,935	5	0.03 %
Insulators*	17,935	15	0.08%

The numbers of components requiring repairs in the period are summarized below:

Table 3

Component	Number Requiring Repairs in the Period	Number of Repairs Completed in the Period	%	Number of Repairs Not Completed in the Period	%
Wood Poles	0	0	100%	0	0.0%
Wood Structures	0	23	100%	0	0.0%
Non-Wood Structures	0	0	100%	0	0.0%
Conductors*	0	0	100%	0	0.0%
Insulators*	0	1	100%	0	0.0%

*Note: Because Ameren Missouri's Transmission System Inspection Program is carried out on a per line basis and only those components which required repair are recorded, the number of individual conductors and insulators inspected is not recorded. The number of wood structures (which includes poles) and non-wood structures inspected will be used as the reference for the percentage of equipment requiring corrective action in this annual report.

The following equipment was scheduled for repairs outside the reporting period:

Table 4

Component	Total Number Requiring Repairs Outside the Reporting Period	Number of Open Repairs Outside the Reporting Period	Corrective Action Scheduled Complete			Percent of Equipment in Need of Corrective Action, but with a Scheduled Date Beyond the Reporting Period
			2022	2023	Later	
Wood Poles*	70	0	70	0	0	100%
Wood Structures*	139	116	96	20	0	83%
Non-Wood Structures*	0	0	0	0	0	N/A%
Conductors*	5	5	1	4	0	100%
Insulators*	15	14	3	11	0	93%

Distribution System Inspections

Ameren Missouri conducted inspections on its Distribution System during calendar year 2021 as required by Missouri Public Service Commission Rule 20 CSR 4240-23.020, Electrical Corporation Infrastructure Standards. The inspections conducted, as well as the deficiencies discovered and repaired as a result of these inspections, are described below

Distribution Circuits and Components Inspected in 2021

Table 5

Inspection	Inspection Units	Inspections Scheduled	Inspections Completed in 2021	Inspections Completed in 2022	Inspections Not Completed
Overhead Visual *	Circuit	370	370		0
Overhead Ground Line *	Circuit	199	199		0
Capacitors	Equipment	1,207	1,207		0
Voltage Regulators	Equipment	583	583		0
Underground Patrol	Circuit	303	303		0
Underground Detailed	Circuit	305	305		0
Network Vaults ^	Equipment	105	4	34	67
Manholes	Equipment	1,714	1,714		0
Other Underground Structures **	Equipment	80	11	64	5

*Note: Streetlight inspections were performed in conjunction with Overhead Visual and Ground Line inspections, as well as the Underground Patrol and Detailed inspections.

^ Note: A significant number of inspections were completed but due to syncing issues with technology the data was lost. As a result, the Service Test group began reverting to doing both a paper and digital inspection, thus increasing the amount of time required to perform inspections. While 45 inspections were in fact completed on paper, the 2021 completion figures above reflect only those where the data was captured electronically. The syncing issue has been resolved and the 67 remaining inspections not completed (which includes the 45 performed on paper) will be finished in 2022.

**Note: Other Underground Structures include Indoor Rooms and Manhole Transformers. A significant number of inspections were completed but due to syncing issues with technology the data was lost. As a result, the Service Test group began reverting to doing both a paper and digital inspection, thus increasing the amount of time required to perform inspections. The 2021 completion figures above reflect only those where the data was captured electronically. The syncing issue has been resolved and the 5 remaining inspections not completed will be finished in 2022.

The results of the inspections are summarized as follows:

Table 6
Results of Inspections

Component	Number Inspected	Number Requiring Repairs	Percentage
Poles/Towers*	167,063	3,179	1.90%
Anchors*	167,063	23	0.00%
Conductors*	167,063	339	0.20%
Crossarm Braces*	167,063	654	0.40%
Crossarms*	167,063	3,115	1.90%
Fuses*	167,063	56	0.00%
Grounding*	167,063	1,318	0.80%
Guy Wires*	167,063	1,694	1.00%
Insulators*	167,063	1,751	1.00%
Lightning Arresters*	167,063	540	0.30%
Minor Hardware*#	167,063	2,487	1.50%
Overhead Transformers*	167,063	66	0.00%
Reclosers*	167,063	0	0.00%
Sectionalizers*	167,063	0	0.00%
Switches	167,063	3	0.00%
Capacitors*	1,207	175	14.50%
Voltage Regulators	583	48	8.20%
UG Pad-Mounted Equipment**	42,742	3,064	7.20%
Network Vaults	40	3	7.50%
Manholes*	1,714	258	15.10%
Other Underground Structures***	70	0	0.00%
Streetlights	27,139	1,448	5.30%

*Note: Because Ameren Missouri's Distribution System Circuit Inspection and Ground Line Inspection programs were performed on a per circuit basis and only those components which required repair were recorded, the numbers of these individual devices inspected were not recorded. For these components, the number of poles where problems were identified divided by the number of poles inspected was used as the reference for the percentage of equipment requiring corrective action. Where the actual number of components inspected, such as voltage regulators and capacitors could be ascertained, these numbers were used to calculate the percentage of equipment requiring corrective action.
#Note: Minor Hardware includes risers, pins, jumpers, connectors, splices, terminations, and spacer cable brackets.
**Note: Underground Pad-Mounted Equipment includes pad-mounted transformers, switchgear, junction boxes, non-traffic rated vaults, and pedestals.
***Note: Other Underground Structures includes indoor rooms and manhole transformers.

The numbers of components requiring repairs in the period are summarized below:

Table 7

Component	Number of Repairs Scheduled in the Period	Number of Repairs Completed in the Period	% Repairs Completed in Period	Number of Repairs Not Completed in the Period	% Repairs Not Completed in Period
Poles/Towers*	279	279	100%	0	0.00%
Anchors*	0	0	N/A	0	0.00%
Conductors*	0	0	N/A	0	0.00%
Crossarm Braces*	0	0	N/A	0	0.00%
Crossarms*	0	0	N/A	0	0.00%
Fuses*	0	0	N/A	0	0.00%
Grounding*	0	0	N/A	0	0.00%
Guy Wires*	0	0	N/A	0	0.00%
Insulators*	0	0	N/A	0	0.00%
Lightning Arresters*	0	0	N/A	0	0.00%
Minor Hardware*#	0	0	N/A	0	0.00%
Overhead Transformers*	0	0	N/A	0	0.00%
Reclosers*	0	0	N/A	0	0.00%
Sectionalizers*	0	0	N/A	0	0.00%
Switches	0	0	N/A	0	0.00%
Capacitors*	112	112	100%	0	0.00%
Voltage Regulators	21	21	100%	0	0.00%
UG Pad-Mounted Equipment**	183	183	100%	0	0.00%
Network Vaults	0	0	N/A	0	0.00%
Manholes*	0	0	N/A	0	0.00%
Other Underground Structures***	0	0	N/A	0	0.00%
Streetlights	638	638	100%	0	0.00%

The following equipment was scheduled for repairs outside the reporting period:

Table 8

Component	Total Number Requiring Repairs Outside the Reporting Period (Completed or Scheduled)	Number of Open Repairs Outside the Reporting Period	Corrective Action Scheduled in 2022	Corrective Action Scheduled Later	Percent of Equipment in Need of Corrective Action but with a Scheduled Date Beyond the Reporting Period
Poles/Towers*	2900	2129	2072	57	91.2%
Anchors*	23	22	1	21	100.0%
Conductors*	339	334	19	315	100.0%
Crossarm Braces*	654	654	46	608	100.0%
Crossarms*	3115	3114	274	2840	100.0%
Fuses*	56	56	3	53	100.0%
Grounding*	1318	1315	80	1235	100.0%
Guy Wires*	1694	1679	153	1526	100.0%
Insulators*	1751	1747	97	1650	100.0%
Lightning Arresters*	540	537	33	504	100.0%
Minor Hardware*#	2487	2458	225	2233	100.0%
Overhead Transformers*	66	63	1	62	100.0%
Reclosers*	0	0	0	0	0.0%
Sectionalizers*	0	0	0	0	0.0%
Switches	3	3	0	3	100.0%
Capacitors*	63	58	58	0	36.0%
Voltage Regulators	27	26	26	0	56.3%
UG Pad-Mounted Equipment**	2881	2244	2095	145	94.0%
Network Vaults	3	3	0	3	100.0%
Manholes*	258	258	0	258	100.0%
Other Underground Structures***	0	0	0	0	0.0%
Streetlights	810	713	711	2	55.9%

*Note: Because Ameren Missouri's Distribution System Circuit Inspection and Ground Line Inspection programs were performed on a per circuit basis and only those components which required repair were recorded, the numbers of these individual devices inspected were not recorded. For these components, the number of poles where problems were identified divided by the number of poles inspected was used as the reference for the percentage of equipment requiring corrective action. Where the actual number of components inspected, such as voltage regulators and capacitors could be ascertained, these numbers were used to calculate the percentage of equipment requiring corrective action.
#Note: Minor Hardware includes risers, pins, jumpers, connectors, splices, terminations, and spacer cable brackets.
**Note: Underground Pad-Mounted Equipment includes pad-mounted transformers, switchgear, junction boxes, non-traffic rated vaults, and pedestals.
***Note: Other Underground Structures includes indoor rooms and manhole transformers.