



## Ameren Missouri 20 CSR 4240-23.010 Electric Utility System Reliability Monitoring and Reporting Submission Requirements – Annual Reliability Report

### Introduction

This report details Union Electric (dba Ameren Missouri) Company's annual reliability metrics and worst performing circuits for calendar year 2020 as required by Missouri Public Service Commission Rule 4 CSR 240-23.010, Electric Utility System Reliability Monitoring and Reporting Submission Requirements (referred to in the remainder of this document as "the Rule"). This report is required by Sections (2), (7), and (8) of the Rule which state, *"The information required by section (1) shall be filed annually by the last business day of April of the calendar year following the calendar year for which the information was accumulated.... The information developed in accordance with section (6) shall be reported as part of the annual report required by section (2).... If on or after the time the annual report required by section (7) for calendar year 2011 is filed, a circuit has been on the worst performing circuit list for two (2) of the three (3) most recent consecutive calendar years the electrical corporation shall include detailed plans and schedules for improving the performance of that circuit in addition to the other information required by section (7)."* This report will provide the reliability measures requested by the Rule, the list of Worst Performing Circuits (WPCs), including Multi-Year Worst Performing Circuits (MWPCs), and the actions taken or planned to improve the performance of these circuits.

### Definitions

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

1. System Average Interruption Frequency Index (SAIFI) – The average frequency of service interruptions in number of occurrences per customer (total number of customer interruptions divided by the total number of customers served).
2. Customer Average Interruption Frequency Index (CAIFI) – The average number of interruptions per customer interrupted (total number of customer interruptions divided by the total number of customers affected).
3. System Average Interruption Duration Index (SAIDI) – The average interruption in minutes per customer served (sum of all customer interruption durations divided by the total number of customers served).
4. Customer Average Interruption Duration Index (CAIDI) – The average interruption duration (sum of all customer interruption durations divided by the total number of customers interrupted).



5. Worst Performing Circuit (WPC) – A distribution circuit whose SAIFI value, adjusted to exclude major storm events per IEEE Standard 1366-2012, when compared to the SAIFI values for the other circuits in the Ameren Missouri system places it among the 5% of circuits with the highest SAIFI values in the Ameren Missouri system.
6. Multi-Year Worst Performing Circuit (MWPC) – A distribution circuit whose SAIFI value has ranked it as a Worst Performing Circuit for any two (2) of the three (3) most recent consecutive calendar years.

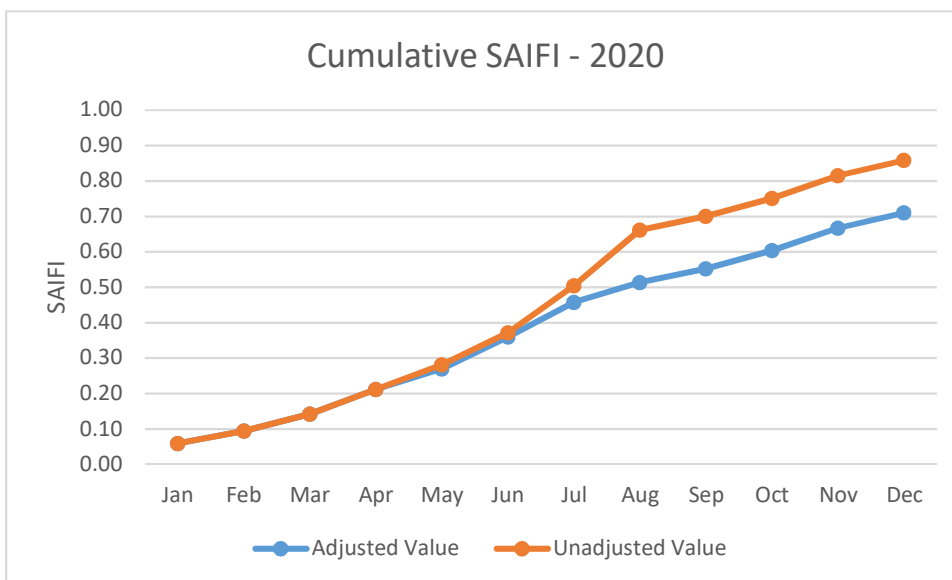


## Reliability Metrics

4 CSR 240-23.010, section 3 states “The information required by section (1) shall be filed both unadjusted and adjusted to exclude major storm events per IEEE Standard 1366-2012, Guide for Electric Power Distribution Reliability Indices.” The following tables and graphs show Ameren Missouri’s unadjusted and adjusted reliability metrics for calendar year 2020:

SAIFI:

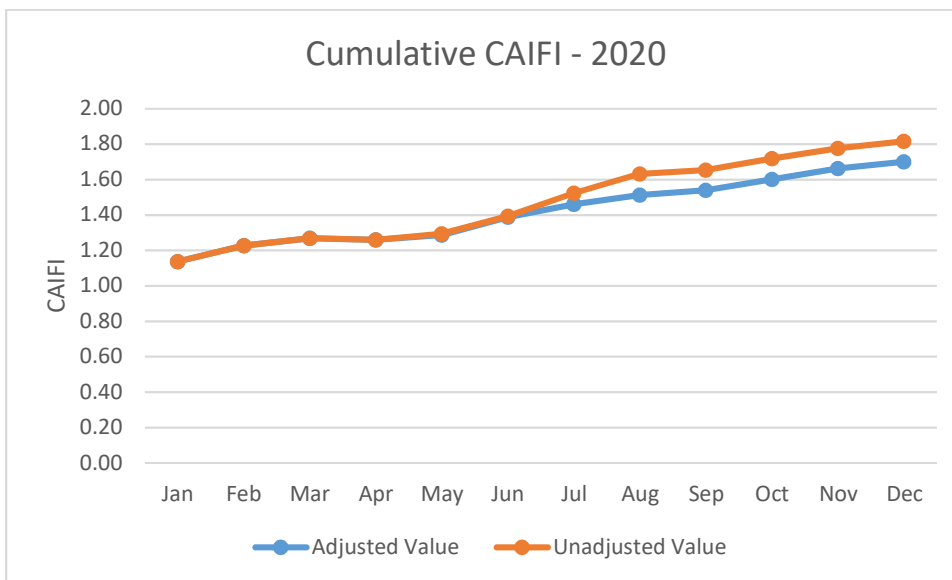
MONTH	Adjusted Value	Unadjusted Value
Jan	0.06	0.06
Feb	0.09	0.09
Mar	0.14	0.14
Apr	0.21	0.21
May	0.27	0.28
Jun	0.36	0.37
Jul	0.46	0.50
Aug	0.51	0.66
Sep	0.55	0.70
Oct	0.60	0.75
Nov	0.67	0.82
Dec	0.71	0.86





CAIFI:

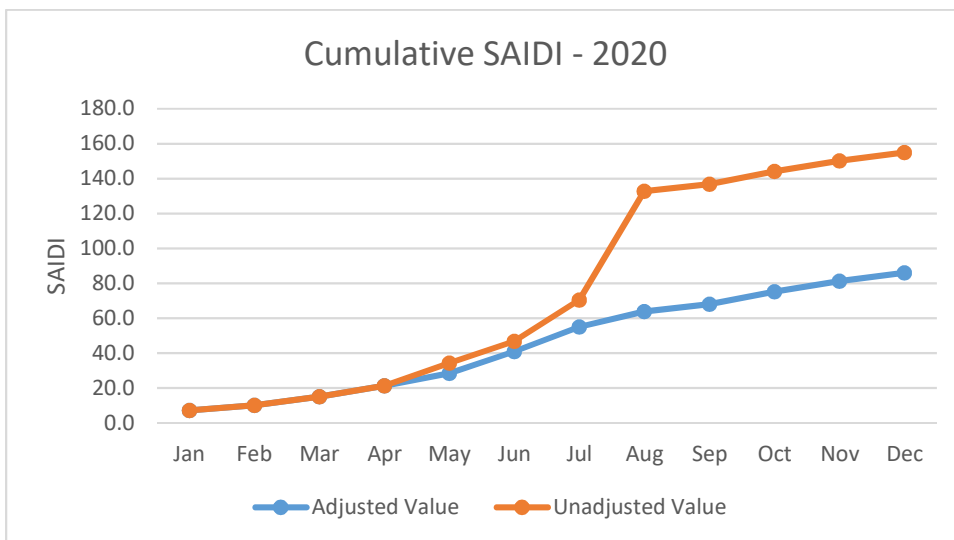
MONTH	Adjusted Value	Unadjusted Value
Jan	1.14	1.14
Feb	1.23	1.23
Mar	1.27	1.27
Apr	1.26	1.26
May	1.29	1.29
Jun	1.39	1.39
Jul	1.46	1.52
Aug	1.51	1.63
Sep	1.54	1.65
Oct	1.60	1.72
Nov	1.66	1.78
Dec	1.70	1.82





SAIDI:

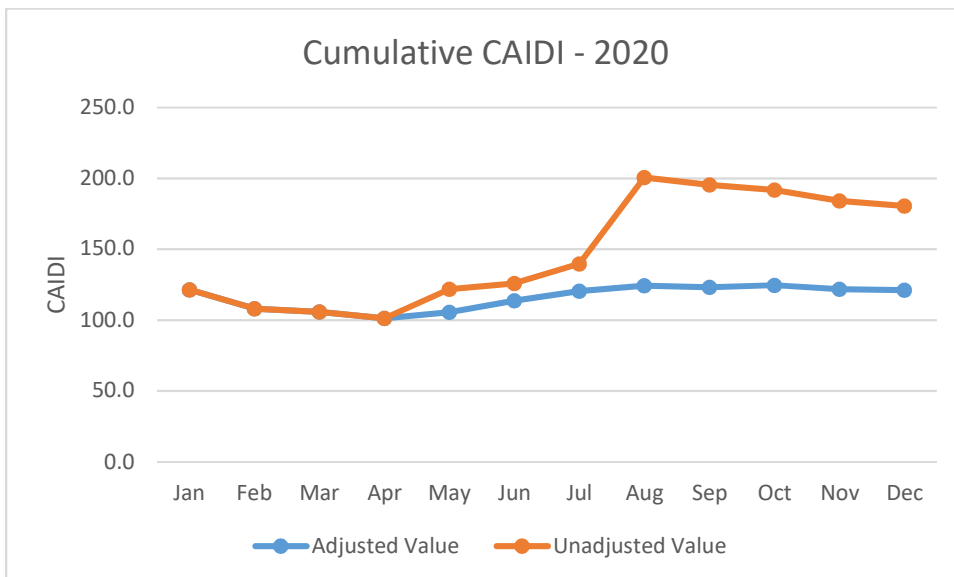
MONTH	Adjusted Value	Unadjusted Value
Jan	7.2	7.2
Feb	10.2	10.2
Mar	15.1	15.1
Apr	21.4	21.4
May	28.5	34.3
Jun	41.0	46.8
Jul	55.1	70.4
Aug	63.9	132.7
Sep	68.0	136.9
Oct	75.2	144.1
Nov	81.3	150.2
Dec	86.1	155.0





CAIDI:

MONTH	Adjusted Value	Unadjusted Value
Jan	121.4	121.4
Feb	108.0	108.0
Mar	105.7	105.7
Apr	101.2	101.2
May	105.5	121.9
Jun	113.8	126.0
Jul	120.4	139.6
Aug	124.4	200.6
Sep	123.1	195.4
Oct	124.6	191.7
Nov	121.8	184.2
Dec	121.2	180.6





### Ameren Missouri 2020 Worst Performing Circuits

Ameren Missouri has performed SAIFI calculations on all of its distribution circuits in accordance with section (6) of the Rule. The circuits have been ranked in order of descending 2020 SAIFI and the 5 percent of the circuits with the highest SAIFI values have been designated as Worst Performing Circuits (WPCs). Multi-Year Worst Performing Circuits (MWPCs) have also been identified. The 2020 WPCs, including those designated as MWPCs are listed in Appendix A. The circuit numbers for the MWPCs have been highlighted in red.

Ameren Missouri has analyzed each of the WPCs for the reasons the circuit qualifies as a WPC and the actions planned or taken to improve the WPC's performance have been included in Appendix B. Each of the MWPCs in Appendix B is identified with the title "Single-Year or Multi-Year WPC Analysis and Remedial Action Report". The MWPC reports contain detailed information regarding work completed or planned to improve the performance of each of the MWPCs as required by the Rule.

### Multi-Year Worst Performing Circuits not on the 2020 WPC list

The MWPCs circuits not identified as WPCs in 2020 but which were WPCs in 2018 and 2019 are listed in Appendix C. Appendix D details the actions taken and/or planned to improve the performance of these circuits.

### Conclusion

This report satisfies the reporting requirements of 4 CSR 240-23.010 for the calendar year 2020. The reported reliability metrics demonstrate continued improvement in the reliability of Ameren Missouri's electric distribution system. With an adjusted SAIFI value of 0.71, Ameren Missouri's customers now experience, on average, less than one extended outage per year. The reported analyses and corrective actions for the Worst Performing Circuits also demonstrate Ameren Missouri's high level of focus on improving reliability and our full commitment to satisfying both the intent and the requirements of this rule.

## APPENDIX B

Division	Operating Area	Circuit	Volt	Cust	CI	CMI	SAIDI	SAIFI	2018	2019	2020	Years WPC
GATEWAY	BERKELEY	134054	12	16	294	92586	5787	18.38			WPC	1
GATEWAY	BERKELEY	156009	4	496	5116	340331	686	10.31			WPC	1
SEMO	CAPE GIRARDEAU	646055	12	34	256	155537	4575	7.53			WPC	1
NORTHEAST MO	WENTZVILLE	674052	12	436	2713	331310	760	6.22	WPC		WPC	2
NORTHEAST MO	LOUISIANA	672051	12	213	1184	282945	1328	5.56			WPC	1
MERAMEC VALLEY	JEFFERSON	168055	12	597	3134	350296	587	5.25	WPC	WPC	WPC	3
SEMO	POTOSI	451054	13	368	1856	568102	1544	5.04		WPC	WPC	2
ARCHVIEW	GERALDINE	252001	4	570	2637	379525	666	4.63			WPC	1
ARCHVIEW	GERALDINE	963058	12	20	90	32059	1603	4.50			WPC	1
GATEWAY	BERKELEY	167055	12	553	2414	341986	618	4.37			WPC	1
GATEWAY	BERKELEY	163006	4	736	2968	312151	424	4.03		WPC	WPC	2
ARCHVIEW	MACKENZIE	020012	4	448	1764	239293	534	3.94			WPC	1
MERAMEC VALLEY	JEFFERSON	195052	12	949	3637	373261	393	3.83			WPC	1
CENTRAL MO	JEFFERSON CITY	923051	12	11	42	4823	438	3.82			WPC	1
ARCHVIEW	MACKENZIE	233001	4	611	2114	394097	645	3.46			WPC	1
GATEWAY	DORSETT	247054	12	375	1253	122243	326	3.34	WPC		WPC	2
GATEWAY	DORSETT	247052	12	371	1234	160132	432	3.33			WPC	1
SEMO	HAYTI	466057	12	201	626	29783	148	3.11			WPC	1
GATEWAY	BERKELEY	162054	12	979	2845	264405	270	2.91			WPC	1
NORTHEAST MO	WENTZVILLE	975052	12	17	48	6793	400	2.82			WPC	1
NORTHEAST MO	LOUISIANA	672053	12	290	784	93867	324	2.70	WPC		WPC	2
ARCHVIEW	MACKENZIE	034007	4	473	1277	166174	351	2.70		WPC	WPC	2
GATEWAY	ST CHARLES	565054	12	701	1873	139272	199	2.67			WPC	1
MERAMEC VALLEY	ELLISVILLE	218053	12	752	1978	474714	631	2.63			WPC	1
CENTRAL MO	EXCELSIOR SPRINGS	982052	12	1217	3183	280066	230	2.62			WPC	1
NORTHEAST MO	WENTZVILLE	647052	12	342	894	154898	453	2.61			WPC	1
MERAMEC VALLEY	FRANKLIN	506051	12	737	1914	131036	178	2.60			WPC	1
MERAMEC VALLEY	ELLISVILLE	165056	12	153	397	80710	528	2.59			WPC	1
ARCHVIEW	MACKENZIE	223051	12	1293	3159	255395	198	2.44			WPC	1
GATEWAY	ST CHARLES	193053	12	1096	2660	300071	274	2.43			WPC	1
MERAMEC VALLEY	ELLISVILLE	292056	12	5	12	31908	6382	2.40			WPC	1
MERAMEC VALLEY	ELLISVILLE	282051	12	889	2131	140529	158	2.40			WPC	1
GATEWAY	DORSETT	267055	12	836	1995	320984	384	2.39			WPC	1
CENTRAL MO	EXCELSIOR SPRINGS	717052	12	758	1806	199921	264	2.38		WPC	WPC	2
MERAMEC VALLEY	JEFFERSON	545051	12	737	1752	180918	245	2.38			WPC	1
SEMO	POTOSI	473053	12	629	1486	169410	269	2.36			WPC	1
GATEWAY	ST CHARLES	193051	12	182	422	58145	319	2.32			WPC	1
MERAMEC VALLEY	FRANKLIN	179051	12	1104	2559	197339	179	2.32			WPC	1
GATEWAY	DORSETT	264056	12	1703	3937	442242	260	2.31			WPC	1
SEMO	CAPE GIRARDEAU	811057	12	1232	2844	152327	124	2.31			WPC	1
SEMO	POTOSI	485052	12	195	449	89371	458	2.30			WPC	1



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Division	Operating Area	Circuit	Volt	Cust	CI	CMI	SAIDI	SAIFI	2018	2019	2020	Years WPC
CENTRAL MO	LAKESIDE	205051	12	364	838	160647	441	2.30	WPC		WPC	2
ARCHVIEW	MACKENZIE	053053	12	736	1691	209935	285	2.30			WPC	1
MERAMEC VALLEY	FRANKLIN	504052	12	852	1947	103481	121	2.29			WPC	1
GATEWAY	BERKELEY	274001	4	484	1096	141979	293	2.26			WPC	1
SEMO	ST FRANCOIS	557053	12	1370	3087	442145	323	2.25			WPC	1
SEMO	POTOSI	451051	13	376	842	318348	847	2.24			WPC	1
MERAMEC VALLEY	ELLISVILLE	217051	12	313	696	157395	503	2.22		WPC	WPC	2
GATEWAY	BERKELEY	274002	4	323	718	84386	261	2.22			WPC	1
ARCHVIEW	GERALDINE	238001	4	683	1493	458868	672	2.19			WPC	1
GATEWAY	ST CHARLES	544054	12	803	1754	152714	190	2.18			WPC	1
SEMO	CAPE GIRARDEAU	814005	4	275	598	63926	232	2.17			WPC	1
MERAMEC VALLEY	FRANKLIN	127054	12	510	1109	116060	228	2.17			WPC	1
NORTHEAST MO	WENTZVILLE	687053	12	943	2050	32775	35	2.17			WPC	1
ARCHVIEW	MACKENZIE	135004	4	879	1886	148594	169	2.15			WPC	1
ARCHVIEW	GERALDINE	317010	4	416	891	37303	90	2.14			WPC	1
GATEWAY	DORSETT	243052	12	122	261	36926	303	2.14			WPC	1
CENTRAL MO	JEFFERSON CITY	961051	12	345	738	34288	99	2.14			WPC	1
GATEWAY	DORSETT	266054	12	98	209	63644	649	2.13			WPC	1
ARCHVIEW	MACKENZIE	233002	4	624	1328	338758	543	2.13			WPC	1
ARCHVIEW	MACKENZIE	253051	12	1609	3415	356413	222	2.12			WPC	1
SEMO	HAYTI	457055	12	440	928	66779	152	2.11		WPC	WPC	2
ARCHVIEW	GERALDINE	155001	4	608	1268	74183	122	2.09			WPC	1
ARCHVIEW	GERALDINE	121003	4	668	1389	133709	200	2.08			WPC	1
GATEWAY	BERKELEY	167056	12	731	1517	101131	138	2.08		WPC	WPC	2
MERAMEC VALLEY	FRANKLIN	555055	12	999	2065	157875	158	2.07			WPC	1
GATEWAY	DORSETT	139002	4	479	987	92926	194	2.06			WPC	1
GATEWAY	BERKELEY	156008	4	585	1204	25259	43	2.06	WPC		WPC	2
CENTRAL MO	MEXICO	791052	12	279	573	45036	161	2.05			WPC	1
GATEWAY	BERKELEY	130004	4	869	1772	246573	284	2.04			WPC	1
GATEWAY	DORSETT	209052	12	171	348	35582	208	2.04			WPC	1
GATEWAY	ST CHARLES	566051	12	447	908	101371	227	2.03			WPC	1
ARCHVIEW	GERALDINE	128007	4	36	73	5388	150	2.03	WPC		WPC	2
ARCHVIEW	MACKENZIE	037001	4	656	1329	116045	177	2.03			WPC	1
CENTRAL MO	JEFFERSON CITY	956052	12	1124	2265	338013	301	2.02			WPC	1
NORTHEAST MO	KIRKSVILLE	858052	12	1	2	86	86	2.00	WPC		WPC	2
GATEWAY	DORSETT	235054	12	14	28	17752	1268	2.00	WPC	WPC	WPC	3
ARCHVIEW	GERALDINE	251008	4	353	706	52606	149	2.00		WPC	WPC	2
ARCHVIEW	MACKENZIE	034010	4	440	880	59248	135	2.00			WPC	1
ARCHVIEW	GERALDINE	142009	4	589	1174	133076	226	1.99			WPC	1
ARCHVIEW	MACKENZIE	015011	4	351	696	266880	760	1.98			WPC	1
GATEWAY	ST CHARLES	583054	12	646	1272	76729	119	1.97			WPC	1

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Division	Operating Area	Circuit	Volt	Cust	CI	CMI	SAIDI	SAIFI	2018	2019	2020	Years WPC
MERAMEC VALLEY	FRANKLIN	585052	12	290	569	88411	305	1.96			WPC	1
SEMO	HAYTI	456055	12	87	167	19573	225	1.92		WPC	WPC	2
MERAMEC VALLEY	JEFFERSON	551056	12	335	641	116060	346	1.91			WPC	1
SEMO	ST FRANCOIS	161054	12	422	807	130350	309	1.91			WPC	1
ARCHVIEW	UNDERGROUND	287056	13	19	36	4725	249	1.89		WPC	WPC	2
GATEWAY	BERKELEY	269001	4	565	1057	311969	552	1.87			WPC	1
ARCHVIEW	MACKENZIE	280053	12	1881	3518	550872	293	1.87			WPC	1
CENTRAL MO	LAKESIDE	578054	12	220	408	52671	239	1.85			WPC	1
ARCHVIEW	MACKENZIE	105004	4	232	424	87825	379	1.83			WPC	1
MERAMEC VALLEY	JEFFERSON	552054	12	1249	2280	201224	161	1.83			WPC	1
CENTRAL MO	JEFFERSON CITY	392051	12	933	1696	159363	171	1.82			WPC	1
GATEWAY	DORSETT	256053	12	624	1130	193654	310	1.81			WPC	1
SEMO	CAPE GIRARDEAU	635001	4	768	1369	387596	505	1.78			WPC	1
ARCHVIEW	MACKENZIE	228055	12	1295	2298	365192	282	1.77			WPC	1
NORTHEAST MO	BROOKFIELD	984052	12	274	486	62815	229	1.77		WPC	WPC	2
NORTHEAST MO	WENTZVILLE	691051	12	1188	2100	117882	99	1.77	WPC		WPC	2
GATEWAY	BERKELEY	265051	12	331	583	84231	254	1.76			WPC	1
GATEWAY	DORSETT	247053	12	843	1472	136070	161	1.75	WPC		WPC	2
MERAMEC VALLEY	JEFFERSON	553055	12	763	1328	115072	151	1.74			WPC	1
CENTRAL MO	JEFFERSON CITY	834001	4	149	259	66127	444	1.74			WPC	1
CENTRAL MO	BOONVILLE	949056	12	1257	2179	151466	120	1.73			WPC	1
GATEWAY	BERKELEY	269004	4	812	1406	206230	254	1.73			WPC	1
NORTHEAST MO	LOUISIANA	795051	12	143	243	98158	686	1.70			WPC	1
CENTRAL MO	EXCELSIOR SPRINGS	772051	13	619	1048	161798	261	1.69			WPC	1
NORTHEAST MO	WENTZVILLE	909053	12	997	1684	176394	177	1.69			WPC	1
ARCHVIEW	UNDERGROUND	287059	13	33	55	6063	184	1.67			WPC	1
MERAMEC VALLEY	JEFFERSON	168057	12	721	1200	425173	590	1.66			WPC	1
NORTHEAST MO	KIRKSVILLE	754002	4	280	459	27627	99	1.64			WPC	1
NORTHEAST MO	WENTZVILLE	674053	12	1130	1845	180137	159	1.63			WPC	1
ARCHVIEW	GERALDINE	225004	4	600	960	180803	301	1.60			WPC	1
CENTRAL MO	MEXICO	962052	12	430	682	54820	127	1.59			WPC	1



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 015011  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63104, 63116  
**Customers Served:** 351  
**Customer Interruptions (CI):** 696  
**SAIFI Value:** 1.98  
**SAIDI Value:** 760

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	326	46.84%	2
OTHER	1	0.14%	1
PUBLIC	369	53.02%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Two incidents account for 99% of the customer interruptions in 2020. The first was due to the public cutting a pole down, possibly to steal copper. The pole was replaced on Work Request 21MT748182. The second incident was due to a broken cross arm, which was repaired on OAS 202920678. Underground detailed and ground line inspections will be completed in 2021. Any repair work identified as a result of these inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 020012  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63101, 63102, 63104, 63106  
**Customers Served:** 448  
**Customer Interruptions (CI):** 1764  
**SAIFI Value:** 3.94  
**SAIDI Value:** 534

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	903	51.19%	5
EQUIPMENT/UG	446	25.28%	1
OTHER	1	0.06%	1
UNKNOWN	414	23.47%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Four incidents account for 93% of the customer interruptions in 2020. One, after the circuit was patrolled, had no issue found but occurred just days before a second issue caused by an underground exit cable failure which was repaired under Work Request 21MT743916. Two other issues were due to broken crossarms on poles located in completely separate areas. These were repaired on Work Requests 21MT749182 and 21MT749440. A full cycle tree trim was completed in 2020 as well as an underground visual and ground line inspections. Any repair work identified as a result of these inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 034007  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63119, 63122  
**Customers Served:** 473  
**Customer Interruptions (CI):** 1277  
**SAIFI Value:** Y2018 - 0.21; Y2019 - 2.27; Y2020 - 2.70  
**SAIDI Value:** 351

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	0	39	982	76.90%	4
OTHER	0	1	0	0.00%	0
PUBLIC	0	438	216	16.91%	3
TREE	0	586	79	6.19%	6
UNKNOWN	0	9	0	0.00%	0

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Two incidents caused 82% of the customer interruptions in 2019. The first resulted from a public vehicle hitting and breaking a pole, repairs were made on Work Request 21MT722186. The second occurred during a thunderstorm when a tree fell and broke several crossarms and the primary conductor. Repairs were made on OAS 191566047. There are no recurring problems on the circuit and no other work is required at this time. A mid-cycle tree trim, an overhead groundline and an underground visual inspection were performed in 2019. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.

#### Corrective Actions Planned

A wire connection burned and led to a circuit outage on 6/8/2020. Repairs were made on OAS 201603793. This outage caused 37% of the circuit's customer interruptions (473 out of 1277). Damage by the public led to a major device outage on 2/12/2020. Repairs were made on Work Request 21MT738286. This outage caused 17% of the customer interruptions (210 out of 1277). Several other fused tap and transformer outages caused the bulk of the remaining customer interruptions (46% of the circuit's total). There are no recurring problems on the circuit and no other work is required at this time.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 034010  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63119  
**Customers Served:** 440  
**Customer Interruptions (CI):** 880  
**SAIFI Value:** 2.00  
**SAIDI Value:** 135

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/UG	440	50.00%	1
TREE	439	49.89%	1
UNKNOWN	1	0.11%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

An unknown problem led to a circuit outage on 4/27/2020. Restoration was completed on OAS 201180794. This outage caused 50% of the customer interruptions (440 out of 880). Tree contact during a storm led to a circuit outage on 8/13/2020. Repairs were made on OAS 202266678. This caused 50% of the customer interruptions (439 out of 880). One other transformer outage caused a single customer outage. There are no recurring problems on the circuit and no other work required at this time. A full cycle tree trim will be completed in 2021.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 037001  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63123  
**Customers Served:** 656  
**Customer Interruptions (CI):** 1329  
**SAIFI Value:** 2.03  
**SAIDI Value:** 177

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	15	1.13%	2
OTHER	1	0.08%	1
PUBLIC	1312	98.72%	2
TREE	1	0.08%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Two incidents account for 99% of the customer interruptions in 2020. The first was due to mylar balloons getting tangled in the conductor. The second was due to a public vehicle hitting and breaking a pole which was replaced on Work Request 21MT738808. A full cycle tree trim will be completed in 2021 as well as underground detailed and ground line inspections. Any repair work identified as a result of these inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 053053  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63126, 63127  
**Customers Served:** 736  
**Customer Interruptions (CI):** 1691  
**SAIFI Value:** 2.30  
**SAIDI Value:** 285

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
PUBLIC	9	0.53%	2
TREE	765	45.24%	6
UNKNOWN	42	2.48%	3
ANIMAL	106	6.27%	11
EQUIPMENT/OH	1	0.06%	1
EQUIPMENT/UG	746	44.12%	5
OTHER	22	1.30%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

A section of the circuit exit cable failed between the circuit breaker at the substation and the terminal pole on 1/3/2020. The cable was isolated and replaced on Work Request 21MT735870. This outage caused 44% of the customer interruptions (738 out of 1691). An equipment problem during a storm led to a circuit outage on 8/10/2020. Repairs were made on OAS 202240447. This outage caused 44% of the customer interruptions (737 out of 1691). Several other fused tap and transformer outages caused the bulk of the remaining customer interruptions (12% of the circuit's total). There are no recurring problems on the circuit and no other work is required at this time.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 105004  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63119, 63123, 63126  
**Customers Served:** 232  
**Customer Interruptions (CI):** 424  
**SAIFI Value:** 1.83  
**SAIDI Value:** 379

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	283	66.75%	11
TREE	134	31.60%	3
UNKNOWN	7	1.65%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

A tree fell on private property at the rear of 1537 Ridgewood during a storm and took down primary. Repairs were made on OAS 20223A807. This outage caused 55% of the circuit's customer interruptions (233 out of 424). Several other fused tap and transformer outages caused the bulk of the remaining customer interruptions (45% of the circuit's total). Engineering set up Work Request 21MT760583 to add a 65T fuse at 1411 Trelane Ave to provide better isolation on a very long private property rear tap. There are no other recurring problems on the circuit and no other work required at this time. A full cycle tree trim was completed in 2020.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 121003  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63105, 63117  
**Customers Served:** 668  
**Customer Interruptions (CI):** 1389  
**SAIFI Value:** 2.08  
**SAIDI Value:** 200

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	5	0.36%	2
EQUIPMENT/UG	3	0.22%	1
PUBLIC	668	48.09%	1
TREE	44	3.17%	3
UNKNOWN	669	48.16%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Damage from a tree during a major storm led to a circuit outage on 7/15/2020. Repairs were made on OAS 201974809. This outage caused 48% of the customer interruptions (669 out of 1389). Damage by the public in the rain led to a faulted underground primary cable causing a circuit outage on 7/20/2020. Repairs were made on Work Request 21MT750068. This caused 48% of the customer interruptions (668 out of 1389). Several other transformer outages caused the remaining customer interruptions (4% of the circuit's total). There are no recurring problems on the circuit and no other work required at this time.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 127054  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63090  
**Customers Served:** 510  
**Customer Interruptions (CI):** 1109  
**SAIFI Value:** 2.17  
**SAIDI Value:** 228

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	15	1.35%	2
EQUIPMENT/OH	558	50.32%	5
LIGHTNING	25	2.25%	1
PUBLIC	511	46.08%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

An overhead malfunction caused over 50% of the 2020 customer interruptions for this circuit during an incident occurring on 01/18/2020. Another 46% of the customer interruptions were attributed to a public vehicle incident occurring on 04/01/20. At this time no improvement actions are planned.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 128007  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63115, 63120  
**Customers Served:** 36  
**Customer Interruptions (CI):** 73  
**SAIFI Value:** Y2018 - 6.91; Y2019 - 0.00; Y2020 - 2.03  
**SAIDI Value:** 150

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
EMPLOYEES	0	0	0	0.00%	0
EQUIPMENT/OH	48	0	72	98.63%	2
EQUIPMENT/UG	0	0	0	0.00%	0
OTHER	1	0	0	0.00%	0
TREE	193	0	1	1.37%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2018) Overgrown trees and vines caused 88% of the customer interruptions on this circuit in 2018. The Forestry team completed a hot spot trim on the circuit in 2018. The scheduled cycle trim for 2019 has also been completed. No further work needed.

#### Corrective Actions Planned

One incident caused nearly 100% of the customer interruptions on this circuit in 2020. A circuit outage occurred during windy conditions and was quickly restored, but a second outage occurred a short time later. A circuit patrol was unable to identify a cause and the power was restored without further incident on OAS 1880685. The circuit was inspected no further action is needed. An underground detailed inspection will be completed in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 130004  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63114, 63121, 63122, 63133  
**Customers Served:** 869  
**Customer Interruptions (CI):** 1772  
**SAIFI Value:** 2.04  
**SAIDI Value:** 284

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	34	1.92%	7
EQUIPMENT/UG	1724	97.29%	6
TREE	14	0.79%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Underground equipment malfunctions at the substation and outages on the PAGE-KING 34kV supply resulted in 97% of the customer interruptions on this circuit in 2020. Repairs were completed at the time of restoration. A full cycle tree trim was completed in 2020. Overhead visual and underground detailed inspections are scheduled to be completed in 2021. Any repair work identified as a result of these inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy. A full cycle tree trim was completed in 2020. No additional work planned in 2021.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 134054  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63031, 63042  
**Customers Served:** 16  
**Customer Interruptions (CI):** 294  
**SAIFI Value:** 18.38  
**SAIDI Value:** 5787

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
CUSTOMER	16	5.44%	1
EMPLOYEES	16	5.44%	1
EQUIPMENT/UG	135	45.92%	8
OTHER	1	0.34%	1
PUBLIC	77	26.19%	5
TREE	26	8.84%	2
UNKNOWN	23	7.82%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

An incident on 4/19/2020 caused 31% of the 2020 customer interruptions (91 customers) when an underground transformer and primary failed/faulted. Repairs were made on Work Request 21MT742361. Another incident on 9/9/2020 accounted for 17% of customer interruptions (51 customers). This incident was due to a failed/faulted underground transformer which was repaired under OAS 202532516. Another incident on 4/5/2020 accounted for 24% of customer interruptions (72 customers). This outage was caused by public excavation which hit our underground service. Repairs were made on Work Request 21MT741395. There are no recurring problems on the circuit and no other work is required at this time. An underground detailed inspection was performed in 2020. A mid-cycle tree trim and overhead visual inspection are scheduled in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 135004  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63109, 63139  
**Customers Served:** 879  
**Customer Interruptions (CI):** 1886  
**SAIFI Value:** 2.15  
**SAIDI Value:** 169

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	1	0.05%	1
EQUIPMENT/UG	1817	96.34%	3
OTHER	32	1.70%	1
PUBLIC	36	1.91%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

A section of the circuit exit cable failed between manhole 7 and the terminal pole on 12/25/2020. The cable was isolated and replaced on Work Request 21MT759972. This outage caused 47% of the customer interruptions (879 out of 1886). A section of Dip-Scanlan-1 failed on 3/3/20. The cable was isolated and replaced on Work Request 21MT739355. This outage caused 44% of the customer interruptions (834 out of 1886). Several other fused tap and transformer outages caused the remaining customer interruptions (9% of the circuit's total). There are no recurring problems on the circuit and no other work is required at this time.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 139002  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63119, 63124  
**Customers Served:** 479  
**Customer Interruptions (CI):** 987  
**SAIFI Value:** 2.06  
**SAIDI Value:** 194

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	10	1.01%	3
OVERLOAD	479	48.53%	1
PUBLIC	480	48.63%	1
TREE	18	1.82%	4

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

There were two circuit outages that caused the majority of customer interruptions in 2020. The first circuit outage was due to public excavation equipment hitting a pole causing damage to the overhead wires. Repairs to the pole and overhead wires were made under Work Request 21MT741524. The second circuit outage was due to an equipment overload. A mid-cycle tree trim and an underground visual inspection were completed in 2020. All repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy. Division Engineering will conduct a circuit patrol in 2021 and review the remaining device outages and transformer outages on this circuit to determine if any additional action is needed.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 142009  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63139  
**Customers Served:** 589  
**Customer Interruptions (CI):** 1174  
**SAIFI Value:** 1.99  
**SAIDI Value:** 226

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	586	49.91%	1
TREE	2	0.17%	2
UNKNOWN	586	49.91%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

There were four incidents on the circuit in 2020 which caused customer outages. Two incidents resulted from tree contact, the trees were trimmed at time of the incidents and power was restored. Another incident occurred when overhead primary phases touched causing a phase to phase fault and several feet of wire burned down. The wire was spliced and power was restored on Work Request 21MT748066. The fourth incident resulted in 49% of the customer interruptions with no discernable cause. The line was patrolled and no issues were found. No additional work is planned on this circuit in 2021. A mid-cycle trim, overhead visual inspection and an underground detailed inspection were completed in 2020. Any repair work identified as a result of these inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 155001  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63136, 63137  
**Customers Served:** 608  
**Customer Interruptions (CI):** 1268  
**SAIFI Value:** 2.09  
**SAIDI Value:** 122

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	1231	97.08%	9
TREE	37	2.92%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Multiple overhead malfunction outages on a single day accounted for 94% of the 2020 customer interruptions. The first circuit outage was restored on OAS 1976617 with relay issues at the recloser. The second circuit outage occurred when primary conductor failed. Repairs were completed on Work Request 21MT755684. No recurring problems were found on the circuit. A mid-cycle tree trim and overhead visual inspection will be completed in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 156008  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63114, 63134  
**Customers Served:** 585  
**Customer Interruptions (CI):** 1204  
**SAIFI Value:** Y2018 - 2.11; Y2019 - 0.29; Y2020 - 2.06  
**SAIDI Value:** 43

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
EMPLOYEES	0	0	0	0.00%	0
EQUIPMENT/OH	32	9	1177	97.76%	10
LIGHTNING	0	0	0	0.00%	0
OTHER	0	0	0	0.00%	0
OVERLOAD	38	0	0	0.00%	0
PUBLIC	0	0	0	0.00%	0
TREE	1185	127	27	2.24%	4
UNKNOWN	0	35	0	0.00%	0

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2018) The two 2018 circuit outages were caused by trees. The last tree trim was in 2016. A 'hot spot' tree trim on circuit backbone was requested under OAS 190783172.

#### Corrective Actions Planned

One outage on 7/22/2020 accounted for 49% of customer interruptions. Another outage on 8/10/2020 accounted for 48% of customer interruptions. Ameren workers were unable to determine the cause of the outage and proceeded to reclose the breaker on OAS 20223A419. There are no recurring problems on the circuit and no other work is required at this time. A full cycle tree trim was performed in 2020.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 156009  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63134  
**Customers Served:** 496  
**Customer Interruptions (CI):** 5116  
**SAIFI Value:** 10.31  
**SAIDI Value:** 686

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	3360	65.68%	18
EQUIPMENT/UG	1005	19.64%	6
TREE	66	1.29%	3
UNKNOWN	685	13.39%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

An event spanning 11/14/2020-11/15/2020 resulted in 53% of the customer interruptions (2713) on this circuit in 2020. Windy conditions were reported which caused damage to primary. The primary was repaired on Work Request 21MT757144. Another incident on 11/10/2020 accounted for 19% of the customer interruptions (982 customers). Windy conditions were reported and the cause of the outage was a broken connector. Repairs were made on Work Request 21MT756850. An incident on 10/16/2020 accounted for 20% of customer interruptions (1005 customers). An underground malfunction caused this outage which was repaired on OAS 202904621. There are no recurring problems on the circuit and no other work is required at this time. A full cycle trim was performed in 2020.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 161054  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63601, 63637, 63640  
**Customers Served:** 422  
**Customer Interruptions (CI):** 807  
**SAIFI Value:** 1.91  
**SAIDI Value:** 309

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	31	3.84%	4
EQUIPMENT/OH	301	37.30%	10
EQUIPMENT/UG	1	0.12%	1
LIGHTNING	3	0.37%	3
OTHER	17	2.11%	1
TREE	454	56.26%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

A broken tree caused the only full circuit outage in 2020 resulting in 52% of the customer interruptions. Various overhead malfunctions accounted for the majority of the remaining interruptions. In late 2020 a project to reconductor 2.3 miles of single phase circuit to three phase and establish a new three phase circuit tie was completed including the installation of three Intellirupters to automate the switching process under Work Requests 28SF043680, 043681 and 043611. Additional reclosers and fuses will be installed in 2021 in various locations to help with tree and animal issues and provide some additional sectionalizing capabilities to minimize customers out under Work Request 28SF046272. An underground detailed inspection is scheduled to be completed in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 162054  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63033, 63139  
**Customers Served:** 979  
**Customer Interruptions (CI):** 2845  
**SAIFI Value:** 2.91  
**SAIDI Value:** 270

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	306	10.76%	6
EQUIPMENT/OH	1092	38.38%	15
EQUIPMENT/UG	1	0.04%	1
LIGHTNING	15	0.53%	1
TREE	1392	48.93%	6
UNKNOWN	39	1.37%	3

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

One incident on 7/7/2020 accounted for 47% of the 2020 customer interruptions (1324 customers). During this incident a tree fell onto our primary lines which tripped a switch and breaker. The tree was removed and repairs made on OAS 201890127. A second incident on 6/14/2020 accounted for 32% of customer interruptions (911 customers) when three 600 amp switches burned open and were replaced under OAS 201660481. Another 10% of customer interruptions on this circuit were due to squirrels, animal guards were added (OAS 201590096). There are no recurring problems on the circuit and no other work is required at this time. A full cycle tree trim and an underground detailed inspection were performed in 2020. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 163006  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63136  
**Customers Served:** 736  
**Customer Interruptions (CI):** 2968  
**SAIFI Value:** Y2018 - 1.14; Y2019 - 2.63; Y2020 - 4.03  
**SAIDI Value:** 424

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	0	1074	2270	76.48%	10
OVERLOAD	0	33	0	0.00%	0
TREE	0	981	697	23.48%	6
UNKNOWN	0	0	1	0.03%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Broken trees which caused damage to poles and overhead primary in multiple locations during a windstorm caused 46% of the customer interruptions during 2019. Another incident on a rainy day caused 42% of the customer interruptions due to an overhead malfunction and broken primary. A mid-cycle tree trim and an overhead visual inspection are scheduled in 2020. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy. No additional work is required at this time.

#### Corrective Actions Planned

One incident on 5/16/2020 accounted for 78% of customer interruptions (2311 customers). The cause of this outage was due to downed primary lines. Repairs were made on OAS 201370067. A second incident during a rainstorm on 8/12/2020-8/13/2020 accounted for 17% of customer interruptions (504 customers). During this event trees fell onto our primary lines. Tree work and repairs were made on OAS 202244038. There are no recurring problems on the circuit and no other work is required at this time. A mid-cycle tree trim and an overhead visual inspection were performed in 2020. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 165056  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63001, 63025, 63069  
**Customers Served:** 153  
**Customer Interruptions (CI):** 397  
**SAIFI Value:** 2.59  
**SAIDI Value:** 528

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	14	3.53%	4
EQUIPMENT/OH	116	29.22%	5
EQUIPMENT/UG	1	0.25%	1
TREE	111	27.96%	3
UNKNOWN	155	39.04%	5

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Customer interruption causes were evenly distributed: overhead equipment (29%), trees (28%), and unknown(39%). Unknown outages were likely caused by the significant private property wooded locations. Tree contact and squirrels would be suspected. A new recloser will replace a fuse (Work Request 21MT764726) to prevent momentary contact causing extended interruptions. A full cycle tree trim is scheduled in 2021. Underground detailed and overhead visual inspections will also be completed in 2021. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 167055  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63137, 63138  
**Customers Served:** 553  
**Customer Interruptions (CI):** 2414  
**SAIFI Value:** 4.37  
**SAIDI Value:** 618

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EMPLOYEES	552	22.87%	2
EQUIPMENT/OH	692	28.67%	13
EQUIPMENT/UG	1	0.04%	1
LIGHTNING	50	2.07%	1
PUBLIC	553	22.91%	1
TREE	559	23.16%	4
UNKNOWN	7	0.29%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Two separate incidents on 3/3/2020 accounted for 46% of customer interruptions (1106 customers). The first outage was due to a public vehicle hitting a pole. The pole and primary were replaced under work request 21MT739364. The cause of the second outage was due to a broken jumper which was repaired on OAS 200634373. Another incident on 6/20/2020 accounted for 23% of customer interruptions (552 customers). This outage was due to tree trimmers accidentally dropping a tree on our primary line. Repairs were made on OAS 201720123. A broken tree on 6/6/2020 accounted for 23% of customer interruptions (513 customers) which was repaired under work request 21MT745804. There are no recurring problems on the circuit and no other work is required at this time. A full cycle tree trim is scheduled in 2021.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 167056  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63136, 63137, 63138  
**Customers Served:** 731  
**Customer Interruptions (CI):** 1517  
**SAIFI Value:** Y2018 - 0.04; Y2019 - 2.20; Y2020 - 2.08  
**SAIDI Value:** 138

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	0	1	43	2.83%	2
EQUIPMENT/OH	0	27	14	0.92%	6
EQUIPMENT/UG	0	1	0	0.00%	0
LIGHTNING	0	720	0	0.00%	0
PUBLIC	0	1	0	0.00%	0
TREE	0	822	1456	95.98%	4
UNKNOWN	0	26	4	0.26%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Broken tree limbs and lightning caused 96% of the customer interruptions on this circuit in 2019. A field review identified two additional isolation points where distribution automation switches will be installed on this circuit in 2020. A mid-cycle tree trim, underground visual and overhead groundline inspections were performed in 2019. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.

#### Corrective Actions Planned

One incident accounted for 96% of customer interruptions in 2020. This incident occurred on 6/30/2020 and was due to a tree falling onto our lines during a rainstorm. Forestry trimmed the tree and repairs were made on OAS 201821846. There are no recurring problems on the circuit and no other work is required at this time. A full cycle tree trim is scheduled in 2021.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 168055  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63028, 63050, 63070  
**Customers Served:** 597  
**Customer Interruptions (CI):** 3134  
**SAIFI Value:** Y2018 - 2.06; Y2019 - 2.68; Y2020 - 5.25  
**SAIDI Value:** 587

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	2	5	31	0.99%	2
CUSTOMER	0	0	6	0.19%	2
EQUIPMENT/OH	4	1810	2267	72.34%	15
EQUIPMENT/UG	15	14	0	0.00%	0
OTHER	0	2	0	0.00%	0
OVERLOAD	0	0	0	0.00%	0
PUBLIC	12	0	0	0.00%	0
TREE	12	318	683	21.79%	4
UNKNOWN	1780	240	147	4.69%	3

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) In 2019, two incidents accounted for 74% of the customer interruptions on this circuit. One was due to a lightning strike and subsequent capacitor damage causing the unit to malfunction. The equipment was replaced on Work Request 26JF147157. The other was during rainy conditions and attributed to a tree contacting two phases and tripping the circuit breaker. Tree contact on a transformer caused another 6% of the customer interruptions causing a recloser (#2098) lock out during rainy conditions. A mid-cycle tree trim was performed in 2019. An engineering inspection is planned for 2020 to ensure no further action is required. (2018) The circuit experienced two outages with no causes found, one in March in calm weather and one in December in windy conditions. These two outages resulted in 97% of the customer interruptions in 2018. In 2019 another circuit outage occurred due to failure of a 3-phase capacitor bank installed near the end of the circuit. There are several layers of system protection

#### Corrective Actions Planned

Several events attributed to outages on this circuit in 2020. One event caused 35% of customer interruptions - a transformer on the backbone failed and caused a circuit outage. Repairs were made on OAS 202360020 replacing the transformer with the new "JA" style that has external fusing to help prevent this type of failure. Another event caused 20% of the customer interruptions when a broken



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cross arm during rainy conditions caused recloser (4382) to trip open. Repairs were made on OAS 201380329. Broken limbs/tree contact account for 38% of customer interruptions. A full cycle tree trim is under way and is expected to be completed by June 2021. There are multiple projects currently being submitted for further improvements to improve reliability on this circuit. Phase-cuts will be completed at several locations to redistribute and balance overall loading on the circuit, allowing our system protection group to install new relays on all circuits, mains, and transformers with updated settings in place of the existing electromechanical relays.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 168057  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63012, 63016, 63050  
**Customers Served:** 721  
**Customer Interruptions (CI):** 1200  
**SAIFI Value:** 1.66  
**SAIDI Value:** 590

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	12	1.00%	5
EQUIPMENT/OH	1062	88.50%	12
EQUIPMENT/UG	17	1.42%	8
LIGHTNING	33	2.75%	2
PUBLIC	1	0.08%	1
TREE	42	3.50%	5
UNKNOWN	33	2.75%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Two incidents caused 88% of the customer interruptions on this circuit in 2020. The first outage was due to a broken pole top that caused contact of the primary conductors. Repairs were completed on OAS 202630048. The second outage was an overhead malfunction that caused a downed primary conductor. Repairs were completed on OAS 202245359. A full cycle tree trim is under way and is expected to be completed in June 2021. No additional work is planned in 2021



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 179051  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63077  
**Customers Served:** 1104  
**Customer Interruptions (CI):** 2559  
**SAIFI Value:** 2.32  
**SAIDI Value:** 179

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
CUSTOMER	2	0.08%	1
EMPLOYEES	1	0.04%	1
EQUIPMENT/OH	1109	43.34%	4
PUBLIC	133	5.20%	2
TREE	33	1.29%	5
UNKNOWN	1281	50.06%	6

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Two circuit outages occurred on the same day resulting in 86% of the 2020 customer interruptions. The first incident resulted from an overhead malfunction during a thunderstorm and repairs were completed on OAS 20220458. Shortly after restoration the circuit experienced another outage but no cause could be determined, the circuit was restored to power without further incident on OAS 202220566.

Malfunctioning lightning arresters were identified during the circuit review and will be replaced on Work Request 23FR067418. A recloser that has tripped from winter peak overloading will be upgraded on Work Request 23FR068540.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 193051  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63301  
**Customers Served:** 182  
**Customer Interruptions (CI):** 422  
**SAIFI Value:** 2.32  
**SAIDI Value:** 319

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	80	18.96%	1
EQUIPMENT/OH	160	37.91%	2
TREE	182	43.13%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Tree issues were the cause of 43% of interruptions in 2020. Two overhead equipment issues caused 38% of the interruptions requiring the replacement of a switch on Work Request 25SC070444. One animal incident caused a fuse to blow resulting in 19% of the customer interruptions. No recurring issues were identified and no further work has been identified at this time.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 193053  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63301  
**Customers Served:** 1096  
**Customer Interruptions (CI):** 2660  
**SAIFI Value:** 2.43  
**SAIDI Value:** 274

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	123	4.62%	5
EQUIPMENT/OH	1138	42.78%	4
EQUIPMENT/UG	110	4.14%	5
OTHER	1	0.04%	1
TREE	1288	48.42%	4

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

An overhead transformer failure caused a circuit outage resulting in 42% of the customer interruptions in 2020. The transformer was replaced on Work Request 25SC070174. The remaining 48% of the interruptions were caused by trees. A full cycle trim is scheduled for 2021. No additional work is planned at this time.





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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 195052  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63012, 63048, 63070  
**Customers Served:** 949  
**Customer Interruptions (CI):** 3637  
**SAIFI Value:** 3.83  
**SAIDI Value:** 393

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
LIGHTNING	5	0.14%	2
PUBLIC	51	1.40%	2
TREE	1115	30.66%	14
UNKNOWN	4	0.11%	2
ANIMAL	9	0.25%	3
EQUIPMENT/OH	2441	67.12%	19
EQUIPMENT/UG	12	0.33%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

One incident caused 35% of the customer interruptions on this circuit in 2020. An insulator failed and caused primary contact resulting in a circuit outage. Repairs were completed on OAS 203033130. A large portion of the outages on this circuit (49%) were caused by tree contact. Due to these tree contact outages, a full trim was ordered in November 2020 and will be completed by June 2021. The Horine substation is scheduled for a full rebuild in 2023 - new transformers, switchgear, etc. No additional work is planned in 2021.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 205051  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 65026, 65032, 65047, 65082  
**Customers Served:** 364  
**Customer Interruptions (CI):** 838  
**SAIFI Value:** Y2018 - 2.53; Y2019 - 0.68; Y2020 - 2.30  
**SAIDI Value:** 441

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	3	1	6	0.72%	5
CUSTOMER	0	0	0	0.00%	0
EMPLOYEES	0	0	0	0.00%	0
EQUIPMENT/OH	353	7	654	78.04%	12
LIGHTNING	0	1	2	0.24%	2
OTHER	11	0	0	0.00%	0
OVERLOAD	172	0	0	0.00%	0
PUBLIC	533	4	0	0.00%	0
TREE	24	346	171	20.41%	12
UNKNOWN	74	5	5	0.60%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2018) Reclosers will be replaced with Intellirupter DA switches under Work Request 27LE039681 for better coordination and sectionalization on the circuit.

#### Corrective Actions Planned

Thirty-eight (38) percent of the customer interruptions in 2020 were due to overhead equipment issues. Another thirty-eight (38) percent were due to tree issues, and the remainder to lightning and animal issues. The Eldon/Tuscumbia area, served by the Mt. Carmel substation, experienced a number of ice and thunderstorm events during 2020 resulting in outages from power line and tree damage. A coordination/phase balancing study and drone inspection completed for the planned overhead visual inspection identified some phase imbalance and a need for lightning arrester, insulator and crossarm replacements that will be addressed under Work Request 27LE042109. No tree issues were identified. Previous improvements to provide sectionalizing of the circuit were to be completed in 2019. After further engineering review, it was decided to install TripSaver Distribution Automation (DA) devices in lieu of Intellirupter switches during 2021. An overhead visual inspection was completed in early 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 209052  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63044, 63045  
**Customers Served:** 171  
**Customer Interruptions (CI):** 348  
**SAIFI Value:** 2.04  
**SAIDI Value:** 208

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	238	68.39%	7
PUBLIC	110	31.61%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Two incidents caused 97% of the customer interruptions in 2020. The first incident was caused by a substation malfunction. The second outage was caused by an overhead malfunction. Multiple spans of primary were repaired on Work Request 21MT751418. Two projects, J0R6M (OTU-TASG 209-52 RELOC), JOQVD (TASG 209-52 EQPT Upgrade) will be completed in 2021 and design for a Taussig substation rebuild starts in 2021 and is currently planned for construction in 2023. An underground detailed inspection will be completed in 2021. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 217051  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63005, 63017, 63038  
**Customers Served:** 313  
**Customer Interruptions (CI):** 696  
**SAIFI Value:** Y2018 - 0.62; Y2019 - 3.24; Y2020 - 2.22  
**SAIDI Value:** 503

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	0	2	0	0.00%	0
EQUIPMENT/OH	0	18	176	25.29%	3
EQUIPMENT/UG	0	17	1	0.14%	1
LIGHTNING	0	9	0	0.00%	0
PUBLIC	0	173	0	0.00%	0
TREE	0	774	519	74.57%	9
UNKNOWN	0	9	0	0.00%	0

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Three incidents with trees caused approximately 57% of the customer interruptions in 2019. One public vehicle hitting a pole caused 39% of the customer interruptions for the year. Engineering reviewed the pole locations hit and found no improvement opportunities. Several transformers that are directly tapped to the primary will be fused on work request 21MT740027. A mid-cycle tree trim is scheduled for 2020.

#### Corrective Actions Planned

Trees caused 75% of the customer interruptions in 2020. Overhead equipment issues caused 25% of the customer interruptions, predominantly when an overhead "loopover" burned open. Permanent repairs were made on OAS order 201361607. An underground visual inspection will be completed in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy. No additional work is planned.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 218053  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63011  
**Customers Served:** 752  
**Customer Interruptions (CI):** 1978  
**SAIFI Value:** 2.63  
**SAIDI Value:** 631

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	1330	67.24%	4
EQUIPMENT/UG	645	32.61%	2
OTHER	2	0.10%	2
TREE	1	0.05%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Two incidents caused almost 100% of the customer interruptions in 2020. The first was an overhead equipment malfunction resulting in down primary during a rainstorm. Repairs were completed on OAS 200180067. The second incident was the failure of a flooded pad mount switchgear. A nearby creek overflowed its banks during record flooding. The switchgear will be raised above the flood level on Work Requests 21MT752870/751937. A mid-cycle tree trim and underground detailed inspection were completed in 2020. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy. No additional work is planned in 2021 other than raising the switchgear as stated above.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 223051  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63123  
**Customers Served:** 1293  
**Customer Interruptions (CI):** 3159  
**SAIFI Value:** 2.44  
**SAIDI Value:** 198

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	231	7.31%	4
EQUIPMENT/OH	2839	89.87%	12
EQUIPMENT/UG	33	1.04%	2
PUBLIC	44	1.39%	1
TREE	12	0.38%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Damage to a pole led to a circuit outage on 6/4/2020. Repairs were made on OAS 201563954. This outage caused 90% of the customer interruptions (2839 out of 3159). Several other fused tap and transformer outages caused the remaining customer interruptions (10% of the circuit's total). There are no recurring problems on the circuit and no other work is required at this time.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 225004  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63120, 63121, 63136  
**Customers Served:** 600  
**Customer Interruptions (CI):** 960  
**SAIFI Value:** 1.60  
**SAIDI Value:** 301

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	312	32.50%	10
EQUIPMENT/UG	3	0.31%	2
OTHER	2	0.21%	2
PUBLIC	2	0.21%	2
TREE	639	66.56%	12
UNKNOWN	2	0.21%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

A circuit outage occurred when a tree broke and fell into the circuit causing 63% (600) of the 2020 customer interruptions. Repairs were completed on Work Request 21MT749631. A broken pole resulted in another 30% (292) of the customer interruptions. The pole was replaced on Work Request 21MT755993. No further actions are required. A mid-cycle tree trim and underground visual inspection will be completed in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 228055  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63123, 63126  
**Customers Served:** 1295  
**Customer Interruptions (CI):** 2298  
**SAIFI Value:** 1.77  
**SAIDI Value:** 282

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	106	4.61%	7
EQUIPMENT/OH	637	27.72%	12
EQUIPMENT/UG	9	0.39%	2
LIGHTNING	13	0.57%	1
PUBLIC	1295	56.35%	1
TREE	238	10.36%	6

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

A tree fell at the intersection of Eddie & Park and Pardee during a storm on 8/10/2020, broke a pole and took down primary. Repairs were made on OAS 20223AB55. This outage caused 48% of the circuit's customer interruptions (1097 out of 2298). The public took down a large tree and accidentally took down a span of primary on 12/9/2020. Repairs were made on Work Request 21MT758733. This outage caused 35% of the circuit's customer interruptions (801 out of 2298). Several other fused tap and transformer outages caused the bulk of the remaining customer interruptions (17% of the circuit's total). There are no recurring problems on the circuit and no other work is required at this time. An overhead visual inspection was completed in 2020. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.





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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 233001  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63119  
**Customers Served:** 611  
**Customer Interruptions (CI):** 2114  
**SAIFI Value:** 3.46  
**SAIDI Value:** 645

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
OTHER	1	0.05%	1
TREE	2105	99.57%	6
UNKNOWN	8	0.38%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Tree contact with the primary at 422 Pasadena led to a circuit outage on 6/22/2020. Repairs were made on OAS 201742005. This outage caused 29% of the customer interruptions (612 out of 2114). A tree broke along the railroad south of the parking lot at 230 Hazel Lane and led to a circuit outage on 3/5/2020. Repairs were made on Work Request 21MT739606. This outage caused 29% of the customer interruptions (605 out of 2114). Several other fused tap and transformer outages caused the bulk of the remaining customer interruptions (42% of the circuit's total). There are no recurring problems on the circuit and no other work is required at this time. A full cycle tree trim was completed in 2020.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 233002  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63102, 63119  
**Customers Served:** 624  
**Customer Interruptions (CI):** 1328  
**SAIFI Value:** 2.13  
**SAIDI Value:** 543

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EMPLOYEES	9	0.68%	1
EQUIPMENT/OH	670	50.45%	5
OTHER	1	0.08%	1
PUBLIC	620	46.69%	1
TREE	28	2.11%	3

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

An equipment problem during a rain storm led to a circuit outage on 4/29/2020. Repairs were made on OAS 2012011445. This outage caused 47% of the customer interruptions (624 out of 1328). A public vehicle hit a pole at Big Bend Blvd and Dale Avenue causing a circuit outage on 11/28/2020. Repairs were made on Work Request 21MT757918. This caused 47% of the customer interruptions (620 out of 1328). Several other transformer outages caused the bulk of the remaining customer interruptions (6% of the circuit's total). There are no recurring problems on the circuit and no other work is required at this time. A full cycle tree trim was completed in 2020.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 235054  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63026, 63088  
**Customers Served:** 14  
**Customer Interruptions (CI):** 28  
**SAIFI Value:** Y2018 - 11.38; Y2019 - 3.43; Y2020 - 2.00  
**SAIDI Value:** 1268

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	0	7	14	50.00%	1
EQUIPMENT/OH	148	1	14	50.00%	1
TREE	0	28	0	0.00%	0
UNKNOWN	0	12	0	0.00%	0

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) The majority of customer interruptions on this circuit in 2019 were caused by a device outage during abnormally switched conditions. The device outage was due to a large tree that fell and made contact with the overhead lines and broke a pole near Pincian Drive and Chariot Drive. The pole and overhead lines were repaired under Work Request 21MT735705. A mid-cycle tree trim was completed in 2019. Division Engineering will review the remaining device and transformer outages on this circuit to determine if any additional action is needed. (2018) There was one circuit outage in 2018 caused by a broken crossarm which occurred during abnormally switched conditions. The crossarm was replaced under work request 21MT692455 in 2018. No further action is planned at this time.

#### Corrective Actions Planned

There were two circuit outages that caused the majority of customer interruptions in 2020. One circuit outage was due to an animal making contact with an overhead transformer causing the upstream fuse to trip. Animal guards will be installed on the overhead transformer under Work Request 21MT736555. The second circuit outage was due to an overhead equipment malfunction. An overhead drone inspection was completed in 2020. All repair work identified as part of the drone inspection will be completed under Work Request 21MT749492. A full cycle tree trim and a ground line inspection are scheduled for 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 238001  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63133  
**Customers Served:** 683  
**Customer Interruptions (CI):** 1493  
**SAIFI Value:** 2.19  
**SAIDI Value:** 672

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EMPLOYEES	11	0.74%	1
EQUIPMENT/OH	749	50.17%	10
OTHER	1	0.07%	1
PUBLIC	618	41.39%	1
TREE	114	7.64%	8

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Two incidents accounted for 88% of the 2020 customer interruptions. The first was an overhead malfunction where primary conductor burned through causing 645 customer interruptions. The second was a public vehicle accident that broke a pole and took down 2 spans of primary causing 618 customer interruptions. Repairs were completed on Work Request 21MT755842. A full cycle tree trim was completed in 2020. An underground visual inspection will be completed in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy. No recurring problems were found and no further action needed.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 243052  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63043, 63045, 63146  
**Customers Served:** 122  
**Customer Interruptions (CI):** 261  
**SAIFI Value:** 2.14  
**SAIDI Value:** 303

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	3	1.15%	1
EQUIPMENT/OH	3	1.15%	2
EQUIPMENT/UG	1	0.38%	1
LIGHTNING	4	1.53%	4
OTHER	5	1.92%	1
PUBLIC	244	93.49%	3
UNKNOWN	1	0.38%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Four incidents caused 82% of the customer interruptions in 2020. The first was due to an underground malfunction during a thunderstorm. The second and third incidents were due to overhead malfunctions. The third incident was due to a public vehicle hitting a pole and was repaired on Work Request 21MT752255. An underground detailed inspection will be completed in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 247052  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63124, 63131  
**Customers Served:** 371  
**Customer Interruptions (CI):** 1234  
**SAIFI Value:** 3.33  
**SAIDI Value:** 432

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	10	0.81%	2
EMPLOYEES	2	0.16%	1
EQUIPMENT/OH	423	34.28%	7
EQUIPMENT/UG	13	1.05%	2
LIGHTNING	18	1.46%	1
OVERLOAD	371	30.06%	1
PUBLIC	372	30.15%	1
TREE	19	1.54%	2
UNKNOWN	6	0.49%	3

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Three incidents caused 90% of the customer interruptions in 2020. All of these incidents were caused by the public. The first incident occurred on 7/6/2020. During skip pole construction for the Warson-Fox T-2 34kV rebuild (21MT734889), 556AAC conductor sagged into the underbuild. The second incident occurred on 11/17/2020 during construction at Conway and Lindbergh when an equipment failure occurred causing a 34kV line to sag into distribution. The third Incident occurred on 12/20/2021. A sub-contractor was working on transferring a pole and a hoist failed allowing the 34KV to sag down into the distribution. No additional work is planned at this time. An underground detailed inspection was completed in 2020. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 247053  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63124, 63131, 63141, 63146  
**Customers Served:** 843  
**Customer Interruptions (CI):** 1472  
**SAIFI Value:** Y2018 - 1.98; Y2019 - 0.94; Y2020 - 1.75  
**SAIDI Value:** 161

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	101	28	83	5.64%	17
EQUIPMENT/OH	105	53	453	30.77%	17
EQUIPMENT/UG	4	3	0	0.00%	0
LIGHTNING	1	6	0	0.00%	0
OTHER	0	1	7	0.48%	2
OVERLOAD	0	0	843	57.27%	1
PUBLIC	1262	0	0	0.00%	0
TREE	175	673	56	3.80%	5
UNKNOWN	29	29	30	2.04%	4

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2018) A common cause of outages in 2018 was tree contact. In July a tree branch had fallen onto the primary conductors and was repaired under Work Request 21MT701120. Other tree related outages occurred in July when tree contact was made on the primary conductors downstream of Fuse SL68080309. These repairs were made under OAS 182055259 and 182100388. This circuit is scheduled to be trimmed in 2019. Another distribution circuit outage was caused by a subtransmission supply issue in August, which was repaired under OAS 182184047. No further corrective actions are recommended at this time.

#### Corrective Actions Planned

Four incidents caused 87% of the customer interruptions in 2020. The first incident occurred on 7/6/2020. During skip pole construction for the Warson-Fox T-2 34kV rebuild (21MT734889), 556AAC conductor sagged into the underbuild. The second was due to an overhead malfunction which was repaired on Work Request 21MT738880. The third incident's cause is unknown and the fourth outage was due to a planned outage. Overhead visual and underground detailed inspections were completed in 2020. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 247054  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63131  
**Customers Served:** 375  
**Customer Interruptions (CI):** 1253  
**SAIFI Value:** Y2018 - 2.15; Y2019 - 0.17; Y2020 - 3.34  
**SAIDI Value:** 326

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	18	12	11	0.88%	7
CUSTOMER	3	0	0	0.00%	0
EQUIPMENT/OH	347	2	816	65.12%	9
EQUIPMENT/UG	322	0	0	0.00%	0
OTHER	0	3	0	0.00%	0
OVERLOAD	0	3	375	29.93%	1
TREE	5	44	31	2.47%	2
UNKNOWN	0	0	20	1.60%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2018) Overhead malfunctions were the leading cause of the circuit outages in 2018. In February an outage caused by a broken pole during a thunderstorm was replaced under OAS 180550072. Other outages included a burnt jumper that was repaired under OAS 181240140 and a cable fault occurring during switching, which was repaired under OAS 181750534. No further corrective actions are recommended at this time.

#### Corrective Actions Planned

Three incidents caused 87% of the customer interruptions in 2020. All of these incidents were caused by the public. The first incident occurred on 7/6/2020. During skip pole construction for the Warson-Fox T-2 34kV rebuild (21MT734889), 556AAC conductor sagged into the underbuild. The second incident occurred on 11/17/2020 during construction at Conway and Lindbergh an equipment failure occurred causing a 34kV line to sag into distribution. The third Incident occurred on 12/20/2021. A sub-contractor was working on transferring a pole and a hoist failed allowing the 34KV to sag down into the distribution. No additional work is planned at this time. Overhead visual and underground detailed inspections were completed in 2020. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.





## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 251008  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63103, 63106, 63108, 63113,  
**Customers Served:** 353  
**Customer Interruptions (CI):** 706  
**SAIFI Value:** Y2018 - 1.45; Y2019 - 2.01; Y2020 - 2.00  
**SAIDI Value:** 149

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	0	1	0	0.00%	0
EQUIPMENT/UG	0	0	353	50.00%	1
PUBLIC	0	734	0	0.00%	0
UNKNOWN	0	0	353	50.00%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Three incidents caused 99% of the customer interruptions in 2019. Each of these incidents were caused by the public. The first incident involved a dig-in to underground primary cable. Cable repairs were completed on Work Request 21MT723118. The second incident occurred when a sub-contractor bored into underground primary. Repairs were completed on Work Request 21MT725245. The third incident involved a public vehicle striking and breaking a 3-phase primary pole. The pole and a span of primary were replaced on Work Request 21MT729642. No additional work is planned at this time. A mid-cycle tree trim, overhead visual and underground detailed inspections were completed in 2019. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.

#### Corrective Actions Planned

Two incidents account for the customer interruptions in 2020. The first outage was deemed a device outage. The circuit was patrolled and no issues were found, the circuit was placed back in service. The second circuit outage resulted from a primary fault on underground cable. Repairs were completed on OAS 202254227. A full cycle tree trim will be completed in 2021. No additional work is planned at this time.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 252001  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63108, 63112, 63113  
**Customers Served:** 570  
**Customer Interruptions (CI):** 2637  
**SAIFI Value:** 4.63  
**SAIDI Value:** 666

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	927	35.15%	11
EQUIPMENT/UG	1139	43.19%	2
OTHER	1	0.04%	1
TREE	1	0.04%	1
UNKNOWN	569	21.58%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

There were four circuit outages in 2020 with the first resulting from a substation malfunction which was restored on OAS 200680085. An overhead malfunction where primary conductor burned open was repaired on OAS 200911999, an underground malfunction due to damaged underground cable, and the final had an unknown cause. No recurring problems were identified and no further actions were identified.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 253051  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63128, 63129  
**Customers Served:** 1609  
**Customer Interruptions (CI):** 3415  
**SAIFI Value:** 2.12  
**SAIDI Value:** 222

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	18	0.53%	1
EQUIPMENT/OH	56	1.64%	10
EQUIPMENT/UG	122	3.57%	6
LIGHTNING	1581	46.30%	1
PUBLIC	27	0.79%	1
TREE	1611	47.17%	4

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Two incidents account for 93% of the customer interruptions in 2020. The first was due to a tree that fell on the primary. The tree was removed on OAS 200175346. The second issue was due to lightning. A mid-cycle tree trim was completed in 2020. An underground visual and overhead visual inspection were performed in 2020. Any repair work identified as a result of these inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 256053  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63043, 63044, 63045  
**Customers Served:** 624  
**Customer Interruptions (CI):** 1130  
**SAIFI Value:** 1.81  
**SAIDI Value:** 310

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	16	1.42%	4
EQUIPMENT/OH	472	41.77%	8
EQUIPMENT/UG	4	0.35%	2
LIGHTNING	28	2.48%	3
TREE	609	53.89%	7
UNKNOWN	1	0.09%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Three incidents caused 88% of the customer interruptions in 2020. The first was due to an overhead malfunction which was repaired on Work Request 21MT744579. The second was due to tree exposure. The third incident occurred during a thunderstorm which caused a tree limb to break and fall on overhead primary. No additional work is planned at this time. An overhead visual inspection will be completed in 2021 and an underground detailed inspection was completed in 2020. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 264056  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63141, 63146  
**Customers Served:** 1703  
**Customer Interruptions (CI):** 3937  
**SAIFI Value:** 2.31  
**SAIDI Value:** 260

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	59	1.50%	9
EMPLOYEES	1	0.03%	1
EQUIPMENT/OH	2931	74.45%	31
EQUIPMENT/UG	39	0.99%	4
LIGHTNING	18	0.46%	1
OTHER	1	0.03%	1
TREE	231	5.87%	10
UNKNOWN	657	16.69%	18

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

The majority of customer interruptions (74%) were due to overhead equipment malfunctions in 2020. An overhead visual inspection was completed in 2020. All repair work identified as a result of the circuit inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy. A full cycle tree trim is scheduled for 2021. Division Engineering will conduct a circuit patrol in 2021 and review the device and transformer outages on this circuit to determine if any additional action is needed.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 265051  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63033  
**Customers Served:** 331  
**Customer Interruptions (CI):** 583  
**SAIFI Value:** 1.76  
**SAIDI Value:** 254

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	9	1.54%	3
EQUIPMENT/OH	368	63.12%	9
EQUIPMENT/UG	1	0.17%	1
TREE	125	21.44%	4
UNKNOWN	80	13.72%	3

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

One outage accounted for 32% of customer interruptions and occurred on 4/15/2020 when a B phase jumper burned open. Two outages in January accounted for 23% of customer interruptions. The first occurred on 1/17/2020 due to trees making contact with lines during an ice event (10% of customer interruptions). The other occurred on 1/31/2020 due to a squirrel which caused a fuse to blow. Repairs were made on OAS 200312744. Several smaller isolated incidents account for the remaining 44% of customer interruptions. There are no recurring problems on the circuit and no other work is required at this time. A full cycle tree trim was performed in 2020. An underground visual inspection is scheduled in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 266054  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63043, 63044, 63045  
**Customers Served:** 98  
**Customer Interruptions (CI):** 209  
**SAIFI Value:** 2.13  
**SAIDI Value:** 649

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
CUSTOMER	5	2.39%	1
EQUIPMENT/OH	1	0.48%	1
EQUIPMENT/UG	198	94.74%	2
OTHER	1	0.48%	1
PUBLIC	3	1.44%	2
UNKNOWN	1	0.48%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Two incidents caused 98% of the customer interruptions in 2020. The first was due to an underground cable failure near pad 23209 which was repaired on Work Request 21MT746277. The second was due to damage to elbow terminations at SWPD 5920 near Rider Trails S and Earth City Expressway. The switchgear was repaired on Work Request 21MT755995. No additional work is planned at this time. An underground detailed inspection will be completed in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 267055  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63005, 63017  
**Customers Served:** 836  
**Customer Interruptions (CI):** 1995  
**SAIFI Value:** 2.39  
**SAIDI Value:** 384

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	71	3.56%	7
EQUIPMENT/OH	17	0.85%	5
EQUIPMENT/UG	1705	85.46%	4
LIGHTNING	52	2.61%	2
TREE	140	7.02%	10
UNKNOWN	10	0.50%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Two incidents caused 84% of the customer interruptions in 2020. The first was due to an underground cable failure on DIP-11357. A new dip was bored as part of work request 21MT748661. The second was an underground malfunction which was repaired on Work Request 21MT752516. The Westbury Subdivision OH-UG Conversion project (WO23273) currently in progress, will be completed in 2021 and includes a section of 267-55. No additional work is planned at this time. Overhead visual and underground detailed inspections will be completed in 2021. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 269001  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63031, 63033, 63121, 63135  
**Customers Served:** 565  
**Customer Interruptions (CI):** 1057  
**SAIFI Value:** 1.87  
**SAIDI Value:** 552

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
CUSTOMER	2	0.19%	1
EQUIPMENT/OH	75	7.10%	9
LIGHTNING	67	6.34%	2
OTHER	22	2.08%	2
PUBLIC	31	2.93%	1
TREE	859	81.27%	11
UNKNOWN	1	0.09%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Broken tree limbs falling on overhead lines resulting in a broken pole, broken crossarm and downed primary wire caused 81% of the customer interruptions on this circuit in 2020. Tree removal and repairs were completed at the time of restoration per OAS 201635029. A mid-cycle tree trim and an underground visual inspection are scheduled for 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy. No additional work is planned for 2021.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 269004  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63042, 63134, 63135  
**Customers Served:** 812  
**Customer Interruptions (CI):** 1406  
**SAIFI Value:** 1.73  
**SAIDI Value:** 254

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	145	10.31%	10
LIGHTNING	38	2.70%	1
OTHER	2	0.14%	2
OVERLOAD	57	4.05%	1
PUBLIC	230	16.36%	1
TREE	933	66.36%	14
UNKNOWN	1	0.07%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Broken tree limbs falling on overhead lines caused 66% of the 2020 customer interruptions on this circuit. Tree removal was completed at the time of restoration. Another 16% of the customer interruptions were caused by a public vehicle accident repaired on OAS 201751471. A mid-cycle tree trim is scheduled for 2021 along with an underground visual inspection. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy. Division Engineering will review device outages and determine if additional work is needed.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 274001  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63114  
**Customers Served:** 484  
**Customer Interruptions (CI):** 1096  
**SAIFI Value:** 2.26  
**SAIDI Value:** 293

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	527	48.08%	3
PUBLIC	28	2.55%	1
TREE	488	44.53%	3
UNKNOWN	53	4.84%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

In 2020, 48% of the customer interruptions on this circuit were caused by overhead equipment malfunctions due to high winds. Repairs were completed at the time of restoration on OAS 201040931. Another 44% of the customer interruptions were caused by broken tree limbs falling on overhead lines during a thunderstorm. Tree removal and repairs were completed at the time of restoration on OAS 201253166. A full cycle tree trim is scheduled for 2021. This circuit will be re-conducted on the PAGE-75 Upgrade Project on 21MT751742 in 2021. The existing 1/0 and 4/0 primary wire will be upgraded to 556AA and all capacitor banks will be upgraded to radio-controlled banks.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 274002  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63114  
**Customers Served:** 323  
**Customer Interruptions (CI):** 718  
**SAIFI Value:** 2.22  
**SAIDI Value:** 261

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	13	1.81%	4
TREE	705	98.19%	6

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Broken tree limbs falling on overhead lines during rainy weather caused 98% of the 2020 customer interruptions on this circuit. Tree removal was completed at the time of restoration per OAS 200180135. A full cycle tree trim is scheduled for 2021. Division Engineering will review device outages and determine if additional work is needed.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 280053  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63129  
**Customers Served:** 1881  
**Customer Interruptions (CI):** 3518  
**SAIFI Value:** 1.87  
**SAIDI Value:** 293

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	54	1.53%	4
EQUIPMENT/OH	2258	64.18%	12
EQUIPMENT/UG	416	11.82%	13
OVERLOAD	10	0.28%	1
PUBLIC	307	8.73%	11
TREE	377	10.72%	8
UNKNOWN	96	2.73%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Six issues account for 93% of the customer interruptions in 2020. Three of these incidents are related to direct buried primary cable failures in the same subdivision. Those cables have been repaired or replaced and there is a project (C-UPGR HNTZ 280-53, Armona Dr) to replace all remaining direct buried primary cable sections in this subdivision in 2021 with new cable in conduit. Another incident was due to a public vehicle hitting a pole. The last two incidents were due to a switch/jumper burning open which was repaired on Work Request 21MT745379, and a tree falling on primary, repaired on OAS 202570185. A full cycle tree trim was completed in 2020.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 282051  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63005, 63011, 63017, 63038  
**Customers Served:** 889  
**Customer Interruptions (CI):** 2131  
**SAIFI Value:** 2.40  
**SAIDI Value:** 158

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	12	0.56%	2
EQUIPMENT/OH	1	0.05%	1
EQUIPMENT/UG	117	5.49%	2
LIGHTNING	4	0.19%	2
PUBLIC	1083	50.82%	4
TREE	893	41.91%	4
UNKNOWN	21	0.99%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Customer interruptions in 2020 were evenly split between public causes (vehicles/excavations 51%) and trees (42%). A public vehicle hit a pole which was replaced on Work Request 21MT736828. Engineering evaluated the pole location and it does not appear to be an issue. Public excavation hit a cable that was repaired on OAS order 202823093. A tree on the primary during a thunderstorm was removed on OAS order 202020853. A full cycle tree trim was completed in 2020. No additional work is planned in 2021.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 287056  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63101, 63102, 63180  
**Customers Served:** 19  
**Customer Interruptions (CI):** 36  
**SAIFI Value:** Y2018 - 1.46; Y2019 - 5.17; Y2020 - 1.89  
**SAIDI Value:** 249

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	0	0	18	50.00%	3
EQUIPMENT/UG	0	61	18	50.00%	2
PUBLIC	0	63	0	0.00%	0

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Two incidents caused by the City of St. Louis Water Division digging into underground facilities account for 51% of the customer interruptions in 2019. The third incident caused by underground equipment failure at Carr & 3rd Street accounts for the other 49%. There were no recurring problems on the circuit and no corrective actions are recommended at this time.

#### Corrective Actions Planned

Ashley 287-56 had only one outage in 2020, which was a cable splice failure, the cable splice was replaced in kind. Other outages to circuit 287-52 were associated to 287-56 - these outages were due to animal contact within a pad mount switchgear, resulting in an equipment failure. The original live-front pad mount switchgear was replaced with a dead front switchgear and animal resistant pad. No further work has been identified at this time. An underground detailed inspection will be completed in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 287059  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63101, 63102  
**Customers Served:** 33  
**Customer Interruptions (CI):** 55  
**SAIFI Value:** 1.67  
**SAIDI Value:** 184

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	21	38.18%	1
EQUIPMENT/UG	6	10.91%	1
OTHER	28	50.91%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

A manhole fire caused damage to the 287059 cable due to a failure of an adjacent network primary circuit that experienced a failed PILC joint. The 287059 bolted joint was replaced. The network primary PILC cables will be removed as part of a project in 2021. The remaining outages were due to adjacent circuits. No further action is required. An underground detailed inspection will be completed in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.





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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 292056  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63017  
**Customers Served:** 5  
**Customer Interruptions (CI):** 12  
**SAIFI Value:** 2.40  
**SAIDI Value:** 6382

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	7	58.33%	2
EQUIPMENT/UG	5	41.67%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Circuit 292056 experienced customer interruptions with almost an even split between overhead equipment issues (58%) and underground issues (42%). The main cause of overhead equipment issues was a burnt phase on an overhead switch. The switch was repaired on OAS order 200162256. The main cause of underground equipment issues was a primary cable fault. The cable fault was repaired on OAS 200312495. An underground visual inspection was completed in 2020 and an overhead visual inspection will be completed in 2021. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy. No additional work is planned in 2021.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 317010  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63107, 63137, 63147  
**Customers Served:** 416  
**Customer Interruptions (CI):** 891  
**SAIFI Value:** 2.14  
**SAIDI Value:** 90

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	43	4.83%	12
EQUIPMENT/UG	1	0.11%	1
OTHER	2	0.22%	2
PUBLIC	441	49.49%	2
TREE	403	45.23%	2
UNKNOWN	1	0.11%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Two circuit outages accounted for the majority of the 2020 customer interruptions. The first was a public vehicle accident which took down primary resulting in 408 customer interruptions (46%) with repairs being completed on Work Request 21MT742981. The second was due to a limb making contact with the primary resulting in 402 customer interruptions (45%). The limb was cleared and power restored on OAS 203154071. No recurring problems were found on the circuit, no further actions are required in 2021. An full cycle tree trim and underground visual inspection will be completed in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 392051  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 65101, 65109  
**Customers Served:** 933  
**Customer Interruptions (CI):** 1696  
**SAIFI Value:** 1.82  
**SAIDI Value:** 171

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	45	2.65%	9
EQUIPMENT/OH	1531	90.27%	12
EQUIPMENT/UG	25	1.47%	6
LIGHTNING	17	1.00%	1
PUBLIC	55	3.24%	1
TREE	11	0.65%	1
UNKNOWN	12	0.71%	3

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Thirty-six (36) percent of the thirty-three (33) total customer interruption incidents on this circuit were caused by overhead equipment issues, while twenty-seven (27) percent were due to animal issues, eighteen (18) percent due to underground equipment issues, and the remainder due to lightning or other issues. Twelve (12) pre-arranged/safety events to set new poles and replace transformers occurred along with two (2) instances of Ameren Transmission loss. A coordination study and drone inspection completed as part of the Worst Performing Circuit field review identified a need for fuse/TripSaver switch upgrades, some insulator replacements as well as additional animal guarding that will be addressed under Work Request 2JCP113509. A mid-cycle tree trim as well as an underground detailed inspection are planned for 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 451051  
**Division:** SEMO  
**ZIP Codes(s) Served:** 65566  
**Customers Served:** 376  
**Customer Interruptions (CI):** 842  
**SAIFI Value:** 2.24  
**SAIDI Value:** 847

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	14	1.66%	4
EMPLOYEES	16	1.90%	1
EQUIPMENT/OH	781	92.76%	6
EQUIPMENT/UG	11	1.31%	1
UNKNOWN	20	2.38%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Two overhead malfunction incidents caused circuit outages for 88% of the 2020 customer interruptions. Completion of Work Request 28IR044547 in 2021 will install 3 new Intellirupter automated reclosers throughout the circuit to provide automated sectionalizing and switching capabilities. Additional reclosers and fuses will be installed at various locations under Work Request 28IR045814. A full cycle tree trim was completed in 2020.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 451054  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63622, 63623, 63625, 63650,,  
**Customers Served:** 368  
**Customer Interruptions (CI):** 1856  
**SAIFI Value:** Y2018 - 0.96; Y2019 - 4.76; Y2020 - 5.04  
**SAIDI Value:** 1544

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	0	36	11	0.59%	6
CUSTOMER	0	11	0	0.00%	0
EQUIPMENT/OH	0	1207	1184	63.79%	32
LIGHTNING	0	10	85	4.58%	5
OTHER	0	6	0	0.00%	0
PUBLIC	0	0	11	0.59%	1
TREE	0	270	489	26.35%	10
UNKNOWN	0	188	76	4.09%	7

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Three new Intellirupters were installed at various locations on the South Viburnum 451-054 circuit to provide automated sectionalizing and switching capabilities with existing circuit ties to minimize the amount of customers out. This work was completed in 2019 under Work Order J0KND / work request 28IR043607.(2018) A new Automated Intellirupter was installed in place of the three 140-V4L reclosers at Switch 2343 to provide automated sectionalizing and switching capabilities with existing circuit ties to minimize customer outage time and the number of customers out. This work was completed in December of 2018 under work request 28IR042867.

#### Corrective Actions Planned

In January of 2021 the communication network was established to enable and bring online 4 Intellirupter reclosers in various locations throughout the circuit to provide automated sectionalizing and switching capabilities. A full cycle tree trim was completed in 2020. No other work is planned for 2021.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 456055  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63827, 63840, 63851, 63857  
**Customers Served:** 87  
**Customer Interruptions (CI):** 167  
**SAIFI Value:** Y2018 - 0.04; Y2019 - 2.11; Y2020 - 1.92  
**SAIDI Value:** 225

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	0	0	14	8.38%	2
EQUIPMENT/OH	0	34	141	84.43%	5
LIGHTNING	0	30	0	0.00%	0
PUBLIC	0	29	0	0.00%	0
TREE	0	93	12	7.19%	3

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) A broken tree incident caused 50% of the customer interruptions in 2019. Trip Savers were installed on Work Request 2TSE123679 in 2019. No other work is planned for 2020. A full cycle tree trim and an overhead visual inspection were completed in 2019. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.

#### Corrective Actions Planned

There were no complete circuit outages on this circuit in 2020. Various devices had overhead malfunctions and account for 84% of the customer interruptions for the year. An additional recloser will be installed to isolate outages and improve circuit operation on Work Request 2TSE130735 in 2021. No other work is planned for 2021.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 457055  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63837, 63847, 63852, 63862,  
**Customers Served:** 440  
**Customer Interruptions (CI):** 928  
**SAIFI Value:** Y2018 - 0.13; Y2019 - 2.82; Y2020 - 2.11  
**SAIDI Value:** 152

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	3	59	6	0.65%	2
CUSTOMER	0	0	0	0.00%	0
EMPLOYEES	0	0	0	0.00%	0
EQUIPMENT/OH	0	668	472	50.86%	5
EQUIPMENT/UG	0	0	2	0.22%	2
LIGHTNING	0	1	2	0.22%	1
OTHER	47	67	9	0.97%	3
PUBLIC	7	0	0	0.00%	0
TREE	0	0	4	0.43%	4
UNKNOWN	1	437	433	46.66%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Two incidents caused 71% of the customer interruptions in 2019. The first was a circuit outage where no cause could be determined during the patrol. The second occurred when the primary conductor burned. Trip savers were installed on Work Request 2TSE123910 in 2019. No other work is planned for 2020. An overhead visual inspection is scheduled for 2020. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy. (2018) Additional storm hardening and lightning protection will be installed under work requests 2TSE123853, 2TSE123854, 2TSE123855, 2TSE123856 and 2TSE123857 in 2019.

#### Corrective Actions Planned

Two circuit outages in April account for 93% (863) of the customer interruptions for 2020. The first on April 16 caused by an overhead malfunction and the second on April 28 where no cause could be determined during the patrol.

Additional reclosers will be installed to isolate outages to improve circuit operation on Work Request 2TSE130738 in 2021. The Distribution Automation group will be reviewing fuse locations in late 2021 for potential replacement with TripSavers. Any TripSaver replacements identified will likely be installed in 2022. An overhead visual inspection was completed in 2020 and an underground detailed



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inspection will be performed in 2021. Any repair work identified as a result of these inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 466057  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63851, 63873, 63879  
**Customers Served:** 201  
**Customer Interruptions (CI):** 626  
**SAIFI Value:** 3.11  
**SAIDI Value:** 148

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	1	0.16%	1
EQUIPMENT/OH	6	0.96%	4
LIGHTNING	1	0.16%	1
OTHER	42	6.71%	1
PUBLIC	572	91.37%	4
TREE	4	0.64%	4

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

A public vehicle accident on June 12 where farm equipment made contact with conductors caused a circuit outage and accounted for 94% of the customer interruptions in 2020. An additional recloser will be installed to isolate outages and improve circuit operation on Work Request 2TSE130736 in 2021. The Distribution Automation group will be reviewing fuse locations in late 2021 for potential replacement with TripSavers. Any TripSaver replacements identified will likely be installed in 2022. A full cycle tree trim, underground visual inspection, and groundline inspection were completed in 2020. Any repair work identified as a result of these inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 473053  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63624, 63631, 63648  
**Customers Served:** 629  
**Customer Interruptions (CI):** 1486  
**SAIFI Value:** 2.36  
**SAIDI Value:** 269

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	381	25.64%	15
EQUIPMENT/OH	706	47.51%	18
LIGHTNING	1	0.07%	1
TREE	395	26.58%	8
UNKNOWN	3	0.20%	3

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

This circuit did not have any full circuit outages in 2021 and most of the customer interruptions were caused by animals and overhead malfunctions. Work Request 28IR045812 will be completed in 2021 to install multiple reclosers, fuses and animal guards in various locations throughout the circuit to address these issues and provide additional sectionalizing capabilities. Additionally in 2021 we are planning on installing 3 new Intellirupter automated reclosers to provide automated switching capabilities with an existing tie point with another circuit. A full cycle tree trim will be completed in 2021. An underground detailed inspection was completed in 2020. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 485052  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63030, 63071, 63080, 63664  
**Customers Served:** 195  
**Customer Interruptions (CI):** 449  
**SAIFI Value:** 2.30  
**SAIDI Value:** 458

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	7	1.56%	4
EQUIPMENT/OH	301	67.04%	10
TREE	99	22.05%	2
UNKNOWN	42	9.35%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

There were no full circuit outages on this circuit in 2020 and most of the customer interruptions resulted from overhead malfunctions. Multiple reclosers and fuses were installed in late 2020 to help with tree and animal issues and to provide more sectionalizing capabilities under Work Request 28IR044546. Additional reclosers and fuses will be installed in various locations in 2021 under Work Request 28IR045813. A full cycle tree trim will be completed in 2021.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 504052  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63039, 63055, 63069  
**Customers Served:** 852  
**Customer Interruptions (CI):** 1947  
**SAIFI Value:** 2.29  
**SAIDI Value:** 121

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	125	6.42%	8
EQUIPMENT/OH	751	38.57%	9
EQUIPMENT/UG	8	0.41%	2
TREE	1061	54.49%	10
UNKNOWN	2	0.10%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

A single event on November 11 caused 55% of total customer interruptions for this circuit in 2020 when a tree fell on the primary line and caused an extended outage. Another 39% of the total customer interruptions for this circuit were due to a public vehicle incident that occurred on 08/11/20 causing an extended outage. Another 6% customer interruptions were attributed to tree related outages. A full cycle tree trim will be completed in 2021. No additional improvement actions are planned at this time.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 506051  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63090  
**Customers Served:** 737  
**Customer Interruptions (CI):** 1914  
**SAIFI Value:** 2.60  
**SAIDI Value:** 178

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	89	4.65%	1
EQUIPMENT/OH	1072	56.01%	5
EQUIPMENT/UG	8	0.42%	1
TREE	745	38.92%	4

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

An incident on April 12 caused 56% of 2020 customer interruptions for this circuit when a set of jumpers and a switch burned open and caused an extended outage. The equipment was immediately replaced. Another 39% of the customer interruptions were attributed to trees during a thunderstorm. No recurring problems were identified and no additional actions are planned at this time.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 544054  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63301  
**Customers Served:** 803  
**Customer Interruptions (CI):** 1754  
**SAIFI Value:** 2.18  
**SAIDI Value:** 190

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	75	4.28%	1
EQUIPMENT/OH	1615	92.08%	4
EQUIPMENT/UG	62	3.53%	1
PUBLIC	2	0.11%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

There were two circuit outages that caused the majority of customer interruptions on this circuit in 2020 and both were due to broken cross arms. The first occurred when a 34kV cross arm broke and fell into the vicinity of this circuit. Repairs were completed on OAS 201192785. The other broken cross arm was on a pole near Summit Point Ct and Old Elm St. The cross arm was repaired under Work Request 25SC070928. No further work has been identified for 2021.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 545051  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63010, 63026, 63128  
**Customers Served:** 737  
**Customer Interruptions (CI):** 1752  
**SAIFI Value:** 2.38  
**SAIDI Value:** 245

#### **Outage Analysis**

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	39	2.23%	5
EMPLOYEES	282	16.10%	1
EQUIPMENT/OH	926	52.85%	5
EQUIPMENT/UG	1	0.06%	1
TREE	456	26.03%	5
UNKNOWN	48	2.74%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### **Corrective Actions**

Most of the 2020 incidents on this circuit resulted from tree contacts. Work Request 26JF156656 has been submitted to reconductor sections of this circuit to provide for alternative substation/circuit ties. Another project currently being developed will implement several automated reclosers on the circuit.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 551056  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63020  
**Customers Served:** 335  
**Customer Interruptions (CI):** 641  
**SAIFI Value:** 1.91  
**SAIDI Value:** 346

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	18	2.81%	6
EQUIPMENT/OH	149	23.24%	7
EQUIPMENT/UG	1	0.16%	1
UNKNOWN	473	73.79%	3

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Two incidents account for 88% of the customer interruptions on this circuit in 2020. The first outage was due to an overhead malfunction and a downed conductor in a difficult to access bluff/creek area to the East of Desoto substation. Repairs were made on OAS 202025195. The second outage does not have a known cause. Crews were dispatched to patrol the line and found no cause for the outage - the breaker was then reset and held without issue. No additional work is planned for 2021





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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 552054  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63019, 63028, 63052  
**Customers Served:** 1249  
**Customer Interruptions (CI):** 2280  
**SAIFI Value:** 1.83  
**SAIDI Value:** 161

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	1	0.04%	1
EQUIPMENT/OH	13	0.57%	7
EQUIPMENT/UG	16	0.70%	2
PUBLIC	998	43.77%	2
TREE	1247	54.69%	2
UNKNOWN	5	0.22%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Three incidents caused 95% of the customer interruptions on this circuit in 2020. The first was a broken tree during rainy conditions that fell on the primary conductors. Repairs were made on OAS 202034068. The second outage was due to customer/public error. A customer was cutting down a tree and it fell into our primary conductor. Repairs were made on OAS 203050279. The third outage is attributed to a public vehicle during rainy conditions causing a downed primary conductor. Repairs were made on OAS 200693033. A mid-cycle tree trim will be completed in 2021. No additional work is planned in 2021.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 553055  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63016, 63023, 63028, 63050,  
**Customers Served:** 763  
**Customer Interruptions (CI):** 1328  
**SAIFI Value:** 1.74  
**SAIDI Value:** 151

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	22	1.66%	5
EQUIPMENT/OH	64	4.82%	9
EQUIPMENT/UG	763	57.45%	1
OTHER	57	4.29%	1
PUBLIC	249	18.75%	3
TREE	123	9.26%	7
UNKNOWN	50	3.77%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Three main outage types (equipment, trees and public vehicles) accounted for more than 80% of the 2020 circuits interruptions. The equipment malfunctions were repaired under Work Request 21MT749646. Several incidents resulted from trees outside the Right Of Way and were repaired/restored on Work Requests 26JF154379, 26JF154906, and 26JF153130. Finally, public vehicle accidents caused outages and were repaired by Work Request 26JF152174 and OAS 1863091 and 1870189. No additional work is planned in 2021.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 555055  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63055, 63084, 63090  
**Customers Served:** 999  
**Customer Interruptions (CI):** 2065  
**SAIFI Value:** 2.07  
**SAIDI Value:** 158

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	7	0.34%	3
EQUIPMENT/OH	1009	48.86%	6
LIGHTNING	2	0.10%	1
PUBLIC	1009	48.86%	3
TREE	36	1.74%	6
UNKNOWN	2	0.10%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

A public vehicle incident that occurred on October 1 resulted in 49% of the 2020 customer interruptions. Another 49% the customer interruptions were due to a malfunctioning MA style transformer on April 4. The transformer was replaced and upgraded to a fused 'JA' style transformer. No additional improvement actions are planned at this time.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 557053  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63601, 63640  
**Customers Served:** 1370  
**Customer Interruptions (CI):** 3087  
**SAIFI Value:** 2.25  
**SAIDI Value:** 323

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	42	1.36%	15
EQUIPMENT/OH	1390	45.03%	8
LIGHTNING	25	0.81%	5
OVERLOAD	40	1.30%	2
PUBLIC	1372	44.44%	2
TREE	218	7.06%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Completion of Work Request 28SF046273 in 2021 will install reclosers, fuses and animal guarding to address tree and animal issues as well as provide more sectionalizing capabilities to minimize the number of customers out. Intellirupters will be installed on Work Request 28SF046274 at existing circuit tie points to automate the switching process to both minimize the number of customers out and reduce the outage time for switching. An underground detailed inspection was completed in 2020. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 565054  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63301, 63304, 63373  
**Customers Served:** 701  
**Customer Interruptions (CI):** 1873  
**SAIFI Value:** 2.67  
**SAIDI Value:** 199

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	21	1.12%	4
EQUIPMENT/OH	116	6.19%	23
EQUIPMENT/UG	1074	57.34%	2
LIGHTNING	5	0.27%	4
OTHER	1	0.05%	1
PUBLIC	644	34.38%	3
TREE	9	0.48%	4
UNKNOWN	3	0.16%	3

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

There were two circuit outages that caused the majority of the customer interruptions on this circuit in 2020. A vehicle accident leading to loss of supply caused 34% of the interruptions. Repairs were completed on Work Request 25SC069208. An underground failure caused 57% of the interruptions. During an operation in the field a switch tripped in a switch pad resulting in an outage. There are no recurring problems on the circuit and no other work is required at this time.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 566051  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63301, 63373, 63386  
**Customers Served:** 447  
**Customer Interruptions (CI):** 908  
**SAIFI Value:** 2.03  
**SAIDI Value:** 227

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	1	0.11%	1
EMPLOYEES	1	0.11%	1
EQUIPMENT/OH	36	3.96%	12
EQUIPMENT/UG	1	0.11%	1
LIGHTNING	17	1.87%	1
OTHER	12	1.32%	1
TREE	835	91.96%	4
UNKNOWN	5	0.55%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Tree incidents caused 92% of customer interruptions in 2020. A tree incident on 9747 N State Route 94 took out all 3 phases causing nearly 50% of the interruptions. No further actions are planned in 2021.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 578054  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 65049, 65079  
**Customers Served:** 220  
**Customer Interruptions (CI):** 408  
**SAIFI Value:** 1.85  
**SAIDI Value:** 239

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	40	9.80%	3
EQUIPMENT/OH	358	87.75%	2
EQUIPMENT/UG	2	0.49%	1
LIGHTNING	7	1.72%	1
UNKNOWN	1	0.25%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Three (3) of the eight (8) total customer interruption incidents in 2020 were due to animal issues, while two (2) were due to overhead equipment issues and the remainder to lightning and underground equipment issues. A majority of the animal issues were due to a single incident involving a snake in switchgear. A coordination study and drone inspection completed as part of the Worst Performing Circuit field review identified a need for fuse upgrades and a crossarm replacement that will be addressed under Work Request 27LE042108. A full cycle tree trim was completed in 2020.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 583054  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63301  
**Customers Served:** 646  
**Customer Interruptions (CI):** 1272  
**SAIFI Value:** 1.97  
**SAIDI Value:** 119

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EMPLOYEES	4	0.31%	1
EQUIPMENT/UG	1266	99.53%	6
OTHER	1	0.08%	1
PUBLIC	1	0.08%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

There were two circuit outages that caused the majority of the customer interruptions in 2020. One outage that caused nearly 50% of the interruptions was due to an operation in the field. While switching back SAWS 17109, a switch in a switch pad failed causing an outage. The other circuit outage was due to failed underground primary between S1176 and S1178 with repairs completed on OAS 201380048. No recurring problems were identified and no further actions are planned in 2021.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 585052  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63011, 63038, 63069, 63073  
**Customers Served:** 290  
**Customer Interruptions (CI):** 569  
**SAIFI Value:** 1.96  
**SAIDI Value:** 305

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	76	13.36%	3
EQUIPMENT/OH	69	12.13%	3
EQUIPMENT/UG	2	0.35%	2
PUBLIC	22	3.87%	1
TREE	369	64.85%	8
UNKNOWN	31	5.45%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Tree related incidents caused 65% of the 2020 customer interruptions. Another 25% were attributed to various animal and overhead malfunction issues downstream of fuse U16797. A work request will be initiated to replace this fuse with a TripSaver to avoid extended outages for temporary faults. No further improvements are identified at this time.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 635001  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63701  
**Customers Served:** 768  
**Customer Interruptions (CI):** 1369  
**SAIFI Value:** 1.78  
**SAIDI Value:** 505

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	1	0.07%	1
EQUIPMENT/OH	546	39.88%	6
PUBLIC	1	0.07%	1
TREE	821	59.97%	6

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

A tree broke and fell into the primary on June 2 causing a circuit outage, repairs were made on OAS 201535286 accounting for 56% of the 2020 customer interruptions. Overhead malfunction incidents caused 40% of the customer interruptions. A project to install three reclosers will be completed to isolate outages and improve circuit operation on Work Request 2TSE130827 in 2021. A mid-cycle trim and underground visual inspection were completed in 2020. An overhead visual inspection will be completed in 2021. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 646055  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63701, 63703  
**Customers Served:** 34  
**Customer Interruptions (CI):** 256  
**SAIFI Value:** 7.53  
**SAIDI Value:** 4575

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	90	35.16%	4
EQUIPMENT/OH	154	60.16%	26
EQUIPMENT/UG	3	1.17%	2
OTHER	4	1.56%	2
TREE	5	1.95%	3

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

This circuit was completely rebuilt and Viper reclosers were added on Work Requests 2TSE124676-2TSE124681. This work coordinated with the installation of Cape Rock Substation in 2020. No additional work is planned. A full cycle tree trim and groundline inspection were completed in 2020. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 647052  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63304, 63332, 63341  
**Customers Served:** 342  
**Customer Interruptions (CI):** 894  
**SAIFI Value:** 2.61  
**SAIDI Value:** 453

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	458	51.23%	9
EQUIPMENT/UG	1	0.11%	1
LIGHTNING	3	0.34%	1
PUBLIC	392	43.85%	2
TREE	4	0.45%	1
UNKNOWN	36	4.03%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Nine separate overhead equipment incidents caused 51% of the customer interruptions on this circuit in 2020. Two separate public vehicle caused incidents caused 44% of the customer interruptions on this circuit in 2020. A mid-cycle tree trim was completed in 2020. Work request 2WWZ197645 will add fault current indicators to all of the circuits on this substation to improve restoration times.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 672051  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63334, 63336, 63353  
**Customers Served:** 213  
**Customer Interruptions (CI):** 1184  
**SAIFI Value:** 5.56  
**SAIDI Value:** 1328

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	1	0.08%	1
EQUIPMENT/OH	988	83.45%	11
LIGHTNING	1	0.08%	1
PUBLIC	171	14.44%	1
TREE	3	0.25%	1
UNKNOWN	20	1.69%	9

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

There were four overhead malfunction incidents that account for 80% of the customer interruptions in 2020. A field review of the circuit was completed. A couple locations had trees near the primary which will be addressed by the full cycle tree trim scheduled in 2021. No further actions are planned for 2021.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 672053  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63334, 63353  
**Customers Served:** 290  
**Customer Interruptions (CI):** 784  
**SAIFI Value:** Y2018 - 2.33; Y2019 - 0.97; Y2020 - 2.70  
**SAIDI Value:** 324

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	5	2	1	0.13%	1
EQUIPMENT/OH	645	78	604	77.04%	9
EQUIPMENT/UG	0	0	0	0.00%	0
LIGHTNING	8	159	2	0.26%	2
OTHER	0	0	1	0.13%	1
PUBLIC	0	23	0	0.00%	0
TREE	24	1	163	20.79%	5
UNKNOWN	0	22	13	1.66%	3

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2020) Two 12.5kV Intellirupter DA switches to facilitate supplying affected customers from a different substation during certain contingencies under Work Request 2WWZ186938 was completed. (2019) The circuit performed much better in 2019 compared to the prior two years. Ameren Vegetation Management has been notified of six 'hot spot' pole locations for tree trimming and to cut/remove vines. (2018) Work Request 2WWZ179995 was completed in 2019 to fuse switches on two single-phase transformers on the three-phase circuit. The mid-cycle tree trim was completed in 2018.

#### Corrective Actions Planned

Three overhead equipmet incidents and two tree issues caused 86% of the customer interruptions in 2020. Overhead visual and underground visual inspections are scheduled for 2021. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy. A field review of the circuit was completed. A couple of locations were identified to trim trees/remove vines which will be completed during the full cycle tree trim scheduled in 2021.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 674052  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63377, 63379  
**Customers Served:** 436  
**Customer Interruptions (CI):** 2713  
**SAIFI Value:** Y2018 - 5.68; Y2019 - 1.03; Y2020 - 6.22  
**SAIDI Value:** 760

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	19	2	2	0.07%	2
EMPLOYEES	4	0	0	0.00%	0
EQUIPMENT/OH	912	66	1458	53.74%	22
LIGHTNING	30	11	14	0.52%	8
PUBLIC	1439	361	1226	45.19%	23
TREE	32	6	12	0.44%	5
UNKNOWN	14	8	1	0.04%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2020) Overhead visual and underground visual circuit inspections were completed in 2020. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy. (2018) Work Request 2WWZ190386 was completed to replace a cross arm, add fuse switches at four locations, replace insulators, and add animal guards to three reclosers.

#### Corrective Actions Planned

Three public caused incidents accounted for 48% of the customer interruptions in 2020 and three overhead malfunction incidents accounted for another 41%. A mid-cycle tree trim is scheduled for 2021. A Work Request will be set up to install a new Intellirupter to replace three reclosers along Hwy H to allow for smart switching with other Intellirupters on the system in 2021.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 674053  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63348, 63379, 63390  
**Customers Served:** 1130  
**Customer Interruptions (CI):** 1845  
**SAIFI Value:** 1.63  
**SAIDI Value:** 159

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	2	0.11%	2
EQUIPMENT/OH	397	21.52%	4
EQUIPMENT/UG	17	0.92%	5
LIGHTNING	1	0.05%	1
PUBLIC	1110	60.16%	2
TREE	295	15.99%	3
UNKNOWN	23	1.25%	5

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Three tree caused incidents, two overhead malfunction events, and one public incident accounted for 94% of the 2020 customer interruptions. A project is planned to replace lightning arresters at three locations and add a set of 3 lightning arresters at another location in 2021 in Troy, MO under Work Request 2WWZ197267. During the circuit patrol a broken cross-arm was found and will be replaced under Work Request 2WWZ203120. The mid-cycle tree trim and an underground detailed inspection are scheduled for 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.





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### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 687053  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63304, 63366, 63368, 63376  
**Customers Served:** 943  
**Customer Interruptions (CI):** 2050  
**SAIFI Value:** 2.17  
**SAIDI Value:** 35

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	22	1.07%	3
EMPLOYEES	943	46.00%	1
EQUIPMENT/OH	1	0.05%	1
LIGHTNING	141	6.88%	1
UNKNOWN	943	46.00%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

One outage with an unknown cause occurred during a thunderstorm resulting in 46% of the customer interruptions on this circuit in 2020. An operating error during restoration on the same day as the mentioned thunderstorm outage caused another 46% of the customer interruptions on this circuit. These two outages on the same day were responsible for 92% of the customer interruptions, there are no major project actions to improve the reliability of this circuit. A full cycle tree trim will be completed in 2021.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 691051  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63334, 63343, 63344, 63359,,  
**Customers Served:** 1188  
**Customer Interruptions (CI):** 2100  
**SAIFI Value:** Y2018 - 2.07; Y2019 - 1.05; Y2020 - 1.77  
**SAIDI Value:** 99

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	9	9	42	2.00%	14
CUSTOMER	0	0	0	0.00%	0
EQUIPMENT/OH	2278	1084	289	13.76%	31
EQUIPMENT/UG	0	0	2	0.10%	1
LIGHTNING	85	86	61	2.90%	10
OTHER	0	0	3	0.14%	3
OVERLOAD	0	0	26	1.24%	1
PUBLIC	0	1	1621	77.19%	4
TREE	70	12	40	1.90%	9
UNKNOWN	13	58	16	0.76%	5

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Three incidents involving overhead equipment malfunctions caused 78% of the customer interruptions in 2019. Two leaning poles are planned to be replaced along Hwy E under work request 2WWZ196734. Addition of three lightning arresters along Hwy D and replacement of one broken V-brace along Hwy E are scheduled in 2020 under work request 2WWZ196725. Replacement of a broken pole-top insulator and a few failed lightning arresters along Cannonball Rd are planned under work request 2WWZ196704. Construction of a multi-year project will start in 2020 to extend the Elsberry 630-53 12.5kV circuit along Hwy B to provide tie capability to this circuit under work order J0FFS. Work requests 2WWZ191437 and 2WWZ191545 are scheduled to be completed this year. Additional projects are planned for the next few years. (Some load on the Auburn 691-51 12.5kV circuit can be picked up in certain contingency conditions.). An underground visual inspection is scheduled in 2020. Any repair work identified as a result of the

#### Corrective Actions Planned

Three overhead malfunction and three public vehicle incidents caused 88% of the customer interruptions in 2020. Part one of a multi-year project was completed in 2020 to extend the Elsberry 630-53 12.5kV circuit along Hwy B to provide tie capability to this circuit under work order J0FFS. Part two is



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scheduled to be completed in 2021 and includes Work Requests 2WWZ191150, 2WWZ191546, and 2WWZ191545. Additional projects are planned for 2022 and 2023. An underground visual inspection was completed in 2020. A groundline inspection is scheduled in 2021. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy. A mid-cycle tree trim is scheduled for 2021.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 717052  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 64024, 64062, 64084, 64085  
**Customers Served:** 758  
**Customer Interruptions (CI):** 1806  
**SAIFI Value:** Y2018 - 0.29; Y2019 - 2.30; Y2020 - 2.38  
**SAIDI Value:** 264

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	0	38	9	0.50%	4
EMPLOYEES	0	0	37	2.05%	1
EQUIPMENT/OH	0	90	1546	85.60%	11
EQUIPMENT/UG	0	50	23	1.27%	2
LIGHTNING	0	12	0	0.00%	0
OTHER	0	1	16	0.89%	2
PUBLIC	0	1513	92	5.09%	3
TREE	0	32	70	3.88%	3
UNKNOWN	0	0	13	0.72%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Two incidents caused by the public (vehicle, other damage) caused 87% of the customer interruptions on this circuit in 2019. A field review identified several transformers directly tapped on the circuit backbone which will have fuses installed on Work Request 2HGH056058. A few locations with rapid vegetation growth were also identified for trimming in 2020.

#### Corrective Actions Planned

Th majority of customer interruptions on this circuit in 2020 were caused by overhead equipment malfunctions, which totaled eighty-five (85) percent of all customer interruptions. A project to replace porcelain fuses will be completed on Work Request 2HGH056340. A full cycle tree trim is planned for 2021. No further work has been identified at this time.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 754002  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63452  
**Customers Served:** 280  
**Customer Interruptions (CI):** 459  
**SAIFI Value:** 1.64  
**SAIDI Value:** 99

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	3	0.65%	2
LIGHTNING	1	0.22%	1
PUBLIC	455	99.13%	5

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

A single public incident where farm equipment pulled down primary wire and several poles accounted for 99% of the customer interruptions on this circuit. This single incident resulted in an initial outage and then a second outage during restoration efforts. This circuit has a 2021 SEP project to install two DA devices that will sectionalize this circuit for better reliability.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 772051  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 64650, 64671  
**Customers Served:** 619  
**Customer Interruptions (CI):** 1048  
**SAIFI Value:** 1.69  
**SAIDI Value:** 261

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	14	1.34%	10
EQUIPMENT/OH	720	68.70%	11
LIGHTNING	47	4.48%	1
TREE	120	11.45%	3
UNKNOWN	147	14.03%	7

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

The majority of Customer Interruptions on this circuit were caused by overhead equipment malfunctions, which totaled sixty-eight (68) percent of all customer interruptions. No recurring problems were found and no additional work is planned in 2021. A full cycle tree trim was completed in 2020. Groundline and underground visual inspection were completed in 2020. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 791052  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 65265  
**Customers Served:** 279  
**Customer Interruptions (CI):** 573  
**SAIFI Value:** 2.05  
**SAIDI Value:** 161

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	5	0.87%	2
EQUIPMENT/OH	285	49.74%	4
EQUIPMENT/UG	5	0.87%	1
LIGHTNING	278	48.52%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

The majority of 2020 customer interruptions on this circuit were caused by overhead equipment malfunctions, totalling forty-nine (49) percent of all customer interruptions. No recurring issues were found and no additional work is planned in 2021. A full cycle tree trim is planned for 2021. An underground visual inspection was completed in 2020. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 795051  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63401, 63459, 63467  
**Customers Served:** 143  
**Customer Interruptions (CI):** 243  
**SAIFI Value:** 1.70  
**SAIDI Value:** 686

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	6	2.47%	1
EQUIPMENT/OH	118	48.56%	2
LIGHTNING	6	2.47%	1
TREE	97	39.92%	2
UNKNOWN	16	6.58%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

One tree caused interruption and one overhead malfunction incident accounted for 80% of the 2020 customer interruptions. A field review of the circuit was completed and minimal tree issues were found. A couple of dead trees located off the ROW were given to Vegetation Management to seek permission to cut them down. No additional improvements are planned at this time. An underground visual inspection was completed in 2020. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 811057  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63701, 63703  
**Customers Served:** 1232  
**Customer Interruptions (CI):** 2844  
**SAIFI Value:** 2.31  
**SAIDI Value:** 124

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	42	1.48%	1
EMPLOYEES	1226	43.11%	1
EQUIPMENT/OH	17	0.60%	4
EQUIPMENT/UG	498	17.51%	10
PUBLIC	1061	37.31%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Two incidents resulted in over 80% of the 2020 customer interruptions. The first was a public vehicle accident resulting in a broken pole, repairs were made on Work Request 2TSE127919. The second was due to operator error. No recurring problems were identified. Fuse coordination improvements will be completed on Work Request 2TSE130825 in 2021. A mid-cycle tree trim was completed in 2020 and an underground visual inspection will be completed in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 814005  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63771  
**Customers Served:** 275  
**Customer Interruptions (CI):** 598  
**SAIFI Value:** 2.17  
**SAIDI Value:** 232

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	4	0.67%	1
EQUIPMENT/OH	593	99.16%	9
PUBLIC	1	0.17%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

An overhead malfunction caused the majority of the 2020 customer interruptions. A circuit review identified the need to fuse 4 individual taps which will be completed on Work Request 2TSE130826 to isolate outages and improve circuit operation in 2021. Underground visual and overhead visual inspections will be completed in 2021. Any repair work identified as a result of these inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 834001  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 65013, 65014  
**Customers Served:** 149  
**Customer Interruptions (CI):** 259  
**SAIFI Value:** 1.74  
**SAIDI Value:** 444

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	224	86.49%	7
PUBLIC	35	13.51%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

All but one (1) of the eight (8) total customer interruption incidents were due to overhead equipment issues, and half of them occurred on the same date with clear skies. A coordination/phase balancing study and drone inspection completed as part of the Worst Performing Circuit field review identified significant phase imbalance and a need for fuse upgrades as well as lightning arrester and insulator replacements that will all be addressed under Work Request 2JCP113503. A mid-cycle tree trim was completed in 2020. A groundline inspection was completed in 2020. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 858052  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63435  
**Customers Served:** 1  
**Customer Interruptions (CI):** 2  
**SAIFI Value:** Y2018 - 3.00; Y2019 - 1.00; Y2020 - 2.00  
**SAIDI Value:** 86

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	1	0	0	0.00%	0
EQUIPMENT/OH	1	0	2	100.00%	2
EQUIPMENT/UG	0	0	0	0.00%	0
LIGHTNING	1	0	0	0.00%	0
TREE	0	0	0	0.00%	0
UNKNOWN	0	1	0	0.00%	0

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) The outages in 2017, 2018 and 2019 were due to issues on the Culver Stockton College primary meter and the college's system past their primary meter. The customer's fuses on their primary meter pole are labeled K2516 on Ameren mapping for communication purposes. Outages to these fuses are due to customer issues. This circuit is only 300 feet in total length. There is no reliability work needed on this Ameren circuit. (2018) The outages in 2016, 2017 and 2018 were due to issues on the Culver Stockton College primary meter and the college's system past their primary meter. Outages at these fuses are due to customer issues. This circuit is only 300' in total length, it has been inspected by engineering and no reliability work on this Ameren circuit is needed.(2017) The outages in 2016 and 2017 were due to issues on the Culver Stockton College primary meter. The customer's fuses on their primary meter pole are labeled K2516 on Ameren mapping for communication purposes. Outages to these fuses are due

#### Corrective Actions Planned

The outages in 2020 were due to issues on the Culver Stockton College primary meter and the college's customer owned primary system downstream of their primary meter. The customer's fuses on their primary meter pole are labeled K2516 on Ameren mapping for communication purposes. Outages to these K2516 fuses are due to customer issues. No reliability work is needed on this Ameren circuit. A 10-year Smart Energy Plan project is hardening the Carbide-91 sub-transmission supply to this circuit that will improve reliability to all customers on the Canton-12 Substation.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 909053  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63381, 63383  
**Customers Served:** 997  
**Customer Interruptions (CI):** 1684  
**SAIFI Value:** 1.69  
**SAIDI Value:** 177

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	9	0.53%	5
EMPLOYEES	2	0.12%	2
EQUIPMENT/OH	664	39.43%	15
EQUIPMENT/UG	2	0.12%	2
LIGHTNING	1	0.06%	1
PUBLIC	965	57.30%	2
TREE	14	0.83%	5
UNKNOWN	27	1.60%	7

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

There were five overhead malfunction incidents and one public vehicle incident that account for 89% of the customer interruptions in 2020. A field review of the circuit was completed. Four existing fuse switch locations are being evaluated to be replaced with TripSaver fuse switches. A mid-cycle tree trim was completed in 2020. An overhead visual inspection is scheduled for 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 923051  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 65013  
**Customers Served:** 11  
**Customer Interruptions (CI):** 42  
**SAIFI Value:** 3.82  
**SAIDI Value:** 438

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	4	9.52%	1
EQUIPMENT/OH	29	69.05%	6
EQUIPMENT/UG	2	4.76%	2
OTHER	7	16.67%	5

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Almost eighty (80) percent of the fourteen (14) total customer interruption incidents on this circuit were due to pre-arranged/safety events in preparation for a new substation that was completed and placed in service at the end of 2020. A drone inspection completed as part of the Worst Performing Circuit field review did not identify any issues. Therefore, no additional work is planned in 2021. A groundline inspection was completed in 2020 with an underground visual inspection planned for 2021. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy. A mid-cycle tree trim was completed in 2020.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 949056  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 65046, 65068, 65233, 65279  
**Customers Served:** 1257  
**Customer Interruptions (CI):** 2179  
**SAIFI Value:** 1.73  
**SAIDI Value:** 120

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	112	5.14%	9
EQUIPMENT/OH	1307	59.98%	15
LIGHTNING	68	3.12%	4
OTHER	1	0.05%	1
PUBLIC	6	0.28%	1
TREE	685	31.44%	10

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

The majority of 2020 customer interruptions on this circuit were caused by overhead equipment malfunctions. No recurring problems were found. No additional work is planned in 2021.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 956052  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 65101, 65109  
**Customers Served:** 1124  
**Customer Interruptions (CI):** 2265  
**SAIFI Value:** 2.02  
**SAIDI Value:** 301

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	26	1.15%	4
EQUIPMENT/OH	395	17.44%	3
LIGHTNING	24	1.06%	1
PUBLIC	1120	49.45%	3
UNKNOWN	700	30.91%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Thirty-one (31) percent of the thirteen (13) total customer interruption incidents on this circuit were caused by animal issues. Twenty-three (23) percent were attributed to a single public vehicle incident and another twenty-one (21) percent to overhead equipment issues primarily caused by a single lightning/thunderstorm event. A coordination/phase balancing study and drone inspection completed as part of the Worst Performing Circuit field review identified some phase imbalance, animal guarding anomalies, and a need for lightning arrester and insulator replacements as well as minor conductor repairs that will all be addressed under Work Request 2JCP113537. A full cycle tree trim is planned for 2021. An underground visual inspection was completed in 2020 and an overhead visual inspection is planned for 2021. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 961051  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 65043  
**Customers Served:** 345  
**Customer Interruptions (CI):** 738  
**SAIFI Value:** 2.14  
**SAIDI Value:** 99

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	6	0.81%	3
EQUIPMENT/OH	31	4.20%	3
EQUIPMENT/UG	5	0.68%	5
LIGHTNING	12	1.63%	2
OTHER	2	0.27%	2
PUBLIC	2	0.27%	2
TREE	1	0.14%	1
UNKNOWN	679	92.01%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Evaluation of the outages identified twenty-five (25) percent of the twenty (20) total customer interruption incidents on this circuit were due to overhead equipment issues, while fifteen (15) percent were caused by underground equipment issues. Ten (10) percent portions were each attributed to public excavation incidents, animal issues, and lightning, with the remainder due to a single loss of Ameren Transmission as well as tree or other/unknown issues. A coordination/phase balancing study and drone inspection completed as part of the Worst Performing Circuit field review identified some phase imbalance and a need for lightning arrester, insulator and crossarm replacements that will be addressed under Work Request 2JCP113519. A full cycle tree trim was completed in 2020. An underground visual inspection was completed in 2020. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 962052  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 63361, 65262  
**Customers Served:** 430  
**Customer Interruptions (CI):** 682  
**SAIFI Value:** 1.59  
**SAIDI Value:** 127

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	76	11.14%	6
EQUIPMENT/OH	597	87.54%	5
LIGHTNING	6	0.88%	2
OTHER	2	0.29%	2
TREE	1	0.15%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

The majority of customer interruptions on this circuit were caused by the overhead equipment malfunctions, which totaled eighty-seven (87) percent of all customer interruptions on this circuit. No recurring problems were found and no additional work is planned in 2021. A full cycle tree trim is planned for 2021.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 963058  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63110  
**Customers Served:** 20  
**Customer Interruptions (CI):** 90  
**SAIFI Value:** 4.50  
**SAIDI Value:** 1603

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
CUSTOMER	6	6.67%	1
EQUIPMENT/UG	84	93.33%	3

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Three incidents account for 93% of the 2020 customer interruptions. Faulted underground primary cable was repaired on ADMS tickets 1860045 and 1860051. The final incident accounts for 7% of the customer interruptions caused by incorrect switching of a lateral connection in Switchgear 32437. There was an overhead visual inspection completed in 2020. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy. No additional work is planned on this circuit .



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 975052  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63304  
**Customers Served:** 17  
**Customer Interruptions (CI):** 48  
**SAIFI Value:** 2.82  
**SAIDI Value:** 400

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	16	33.33%	2
PUBLIC	32	66.67%	2

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

Two public caused incidents caused 66% of the customer interruptions on this circuit in 2020. Both of these public incidents were the result of a fiber optic contractor boring into the underground cable of this circuit. Repairs were made at the time of the incidents. Two separate animal caused incidents caused 33% of the customer interruptions on this circuit in 2020. A snake in a live front switchpad caused a circuit outage on 10/3/20. Work request 2WWZ200330 will replace this switch pad to a modern dead front switchpad in 2021. A separate live front switchpad with a history of animal caused issues was changed out to a modern dead front switchpad on 2/23/21 with work request 2WWZ200331. There are four existing switch pads in Research Park that are scheduled to be replaced with DA switchpads in 2021 to improve reliability for all of the customers in Research Park, including customers on circuit 975-52. These DA switchpad work requests are 2WWZ202370, 2WWZ202371, 2WWZ202372 and 2WWZ202373.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 982052  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 64062  
**Customers Served:** 1217  
**Customer Interruptions (CI):** 3183  
**SAIFI Value:** 2.62  
**SAIDI Value:** 230

#### Outage Analysis

Causes	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	158	4.96%	10
CUSTOMER	2	0.06%	1
EQUIPMENT/OH	2016	63.34%	12
EQUIPMENT/UG	75	2.36%	13
LIGHTNING	68	2.14%	2
OTHER	8	0.25%	3
PUBLIC	30	0.94%	4
TREE	38	1.19%	6
UNKNOWN	788	24.76%	6

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions

The majority of customer interruptions on this circuit in 2020 were caused by overhead equipment malfunctions, which totaled sixty-three (63) percent of all customer interruptions. Several large projects were completed to increase the reliability for the City of Lawson in 2020, including upgrading critical circuit wire for shorter outage durations. No additional work is planned in 2021. A full cycle tree trim was completed in 2020.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 984052  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 64628  
**Customers Served:** 274  
**Customer Interruptions (CI):** 486  
**SAIFI Value:** Y2018 - 0.34; Y2019 - 2.52; Y2020 - 1.77  
**SAIDI Value:** 229

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	0	18	33	6.79%	9
EQUIPMENT/OH	0	330	363	74.69%	11
EQUIPMENT/UG	0	1	11	2.26%	3
LIGHTNING	0	1	8	1.65%	4
OTHER	0	9	1	0.21%	1
PUBLIC	0	1	70	14.40%	1
TREE	0	330	0	0.00%	0

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Broken trees and overhead equipment malfunctions accounted for 96% of the customer interruptions in 2019. A field review identified reliability issues that will be addressed under work request 2HGH056105. An additional field review is planned for 2020 to identify unfused transformers and taps on the backbone and locations requiring animal guarding.

#### Corrective Actions Planned

Overhead equipment outages caused 75% of the customer interruptions on this circuit in 2020. Public caused outages accounted for 14% of the customer interruptions on this circuit in 2020. Work Request 2HGH056105 addressed overhead equipment issues and was completed in late August 2020. Full cycle tree trimming was completed in 2020. The 2021 SEP Brookfield Substation project replaces all of the old existing substations in Brookfield, including Pershing, with one new substation. This SEP project includes distribution automation, improving the existing Pershing 984-52 circuit. The SEP project for hardening of the BRFD-ADIR-44 circuit is a reliability improvement for the Brookfield Substation.

## APPENDIX C

Division	Operating Area	Circuit	Volt	Cust	CI	CMI	SAIDI	SAIFI	2018	2019	2020	Years WPC
MERAMEC VALLEY	JEFFERSON	553057	12	594	851	98137	165	1.43	WPC	WPC		2
NORTHEAST MO	LOUISIANA	629053	12	260	364	18999	73	1.40	WPC	WPC		2
GATEWAY	DORSETT	147051	12	393	520	99334	253	1.32	WPC	WPC		2
SEMO	DEXTER	685053	12	475	565	27127	57	1.19	WPC	WPC		2
MERAMEC VALLEY	ELLISVILLE	279053	12	490	157	36626	75	0.32	WPC	WPC		2
NORTHEAST MO	LOUISIANA	783053	12	1160	311	31123	27	0.27	WPC	WPC		2
SEMO	HAYTI	459051	12	669	166	17243	26	0.25	WPC	WPC		2
ARCHVIEW	MACKENZIE	150008	4	915	165	17527	19	0.18	WPC	WPC		2
ARCHVIEW	GERALDINE	017010	4	245	44	3102	13	0.18	WPC	WPC		2
ARCHVIEW	GERALDINE	238004	4	753	125	21993	29	0.17	WPC	WPC		2
SEMO	CAPE GIRARDEAU	603005	4	97	8	212	2	0.08	WPC	WPC		2
GATEWAY	DORSETT	266055	12	89	4	252	3	0.04	WPC	WPC		2
ARCHVIEW	MACKENZIE	146009	4	1061	20	1580	1	0.02	WPC	WPC		2



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### **Multi Year WPC Analysis and Remedial Action Report**

**Circuit Number:** 017010  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63104  
**Customers Served:** 245  
**Customer Interruptions (CI):** 44  
**SAIFI Value:** Y2018 - 1.96; Y2019 - 2.00; Y2020 - 0.18  
**SAIDI Value:** 13

#### **Outage Analysis**

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	490	0	36	81.82%	2
EQUIPMENT/UG	0	245	0	0.00%	0
PUBLIC	0	0	0	0.00%	0
TREE	0	1	8	18.18%	1
UNKNOWN	0	245	0	0.00%	0

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### **Corrective Actions Taken**

(2019) Two underground malfunction incidents caused nearly 100% of the customer interruptions on this circuit in 2019. The cause could not be determined for the first incident, with the second being caused by a cable failure which was replaced on work request 21MT714218. A mid-cycle tree trim and underground visual inspection were completed in 2019. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.

(2018) The primary conductor was blown off the insulator pins on pole 104589 and repaired on OAS 183053917. On another section of the circuit the primary was loose and was tightened on OAS 183053088. An infrared inspection was completed in February with no issues found. A drone inspection has been requested for this circuit. Engineering will also check all taps on this circuit to ensure they are fused properly.

#### **Corrective Actions Planned**

The circuit performed well in 2020 with a SAIFI of 0.18 and is a Multi-year Worst Performing Circuit based on 2018 and 2019 performance. No further actions required.





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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 146009  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63111, 63116, 63118  
**Customers Served:** 1061  
**Customer Interruptions (CI):** 20  
**SAIFI Value:** Y2018 - 1.99; Y2019 - 3.65; Y2020 - 0.02  
**SAIDI Value:** 1

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
CUSTOMER	0	0	0	0.00%	0
EMPLOYEES	0	0	0	0.00%	0
EQUIPMENT/OH	47	3428	2	10.00%	2
EQUIPMENT/UG	2037	0	1	5.00%	1
LIGHTNING	0	22	0	0.00%	0
OTHER	0	1	16	80.00%	4
PUBLIC	0	51	0	0.00%	0
TREE	1	0	1	5.00%	1
UNKNOWN	0	356	0	0.00%	0

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Three incidents caused 88% of the customer interruptions in 2019. All three incidents were related and occurred between 2/2/19-2/6/19. The incidents were due to an intermittent failure on the exit cable. All 4,200 feet of existing lead cable from the substation to the terminal pole have been replaced with new 3-750Cu cable on Work Request 21MT715670. Special drone and infrared inspections were performed and work identified as a result of the inspections was completed on Work Request 21MT715439. A mid-cycle tree trim, underground detailed and overhead visual inspections were performed in 2020. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy. (2018) Two incidents caused 98% of the customer interruptions in 2018. One was an underground cable failure in a dip between two overhead sections. Repairs were completed under Work Request 21MT689606. The second was an underground cable failure in the circuit. This was repaired under Work Request 21MT708434. A full cycle tree trim was performed in 2018. The cable failures were in completely unrelated sections of cable and both failed sections have been repaired.

#### Corrective Actions Planned

In 2020 this circuit no longer appeared as a Worst Performing Circuit having only 20 customer interruptions resulting in a 0.02 SAIFI. A full cycle tree trim was completed in 2020 as well as an



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underground detailed and overhead visual inspections. Any repair work identified as a result of these inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 147051  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63122, 63141  
**Customers Served:** 393  
**Customer Interruptions (CI):** 520  
**SAIFI Value:** Y2018 - 1.78; Y2019 - 2.06; Y2020 - 1.32  
**SAIDI Value:** 253

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	20	2	1	0.19%	1
CUSTOMER	25	0	0	0.00%	0
EQUIPMENT/OH	76	800	0	0.00%	0
EQUIPMENT/UG	288	3	510	98.08%	8
LIGHTNING	0	0	0	0.00%	0
PUBLIC	0	0	9	1.73%	1
TREE	1	0	0	0.00%	0
UNKNOWN	288	3	0	0.00%	0

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) A suspected lightning strike caused 84% of the customer interruptions in 2019. Two spans of primary were down near the intersection of New Ballas Rd and Magna Carta Dr. with a large burn mark at the middle of one span. The wire was replaced under Work Request 21MT720164. A full cycle tree trim was completed in 2019, with additional tree trimming in the Magna Carta area in late May/early June. Engineering will review the area in 2020 to determine if an overhead to underground conversion project would be beneficial. (2018) The largest outage in 2018 for this circuit was caused by a 34kV circuit outage due to two burned sleeves on the 34kV cable at pole 21333. This outage, in turn, caused the distribution circuit's breaker to trip at the substation. The 34kV cable was repaired under OAS 182263020. Other outages included a customer-requested planned outage and a burnt jumper on a single phase conductor, which was repaired under work request 21MT690653. No further corrective actions are recommended.

#### Corrective Actions Planned

Circuit 147051 is a Multi-year Worst Performing Circuit based on 2018 and 2019 performance. No further actions are required at this time. An underground detailed and groundline inspections will be completed in 2021. Any repair work identified as a result of these inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 150008  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63111, 63116  
**Customers Served:** 915  
**Customer Interruptions (CI):** 165  
**SAIFI Value:** Y2018 - 2.03; Y2019 - 2.59; Y2020 - 0.18  
**SAIDI Value:** 19

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
EMPLOYEES	1	0	0	0.00%	0
EQUIPMENT/OH	42	977	66	40.00%	4
EQUIPMENT/UG	0	0	1	0.61%	1
LIGHTNING	5	0	0	0.00%	0
OTHER	16	4	2	1.21%	2
PUBLIC	0	0	1	0.61%	1
TREE	1805	1399	94	56.97%	2
UNKNOWN	0	0	1	0.61%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Two incidents caused 97% of the customer interruptions in 2019. The first outage occurred on a calm day. The circuit was inspected and no cause was found allowing the circuit to be restored without further incident. The second incident was due to a tree breaking on a windy day and falling into the primary lines breaking a pole and causing the lines to come down. Repairs were made on OAS 190734497. The outages do not appear to be related. A mid-cycle tree trim will be completed in 2020. Underground detailed and overhead visual inspections are scheduled in 2020. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy. (2018) Two incidents caused 96% of the customer interruptions in 2018. Both incidents were related to downed primary conductors caused by tree issues in a storm. One was repaired under OAS 181346192 and the other under Work Request 21MT697947. A full cycle tree trim was completed in Fall 2018.

#### Corrective Actions Planned

In 2020 this circuit no longer appeared as a Worst Performing Circuit, having only 165 customer interruptions resulting in a 0.18 SAIFI. A full cycle tree trim was completed in 2020 as well as an underground detailed inspection and overhead visual inspection. Any repair work identified as a result of these inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 238004  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63130, 63133  
**Customers Served:** 753  
**Customer Interruptions (CI):** 125  
**SAIFI Value:** Y2018 - 2.28; Y2019 - 2.16; Y2020 - 0.17  
**SAIDI Value:** 29

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	0	0	0	0.00%	0
EMPLOYEES	0	0	0	0.00%	0
EQUIPMENT/OH	840	1391	63	50.40%	4
EQUIPMENT/UG	0	1	0	0.00%	0
LIGHTNING	13	0	0	0.00%	0
OTHER	8	0	2	1.60%	2
OVERLOAD	0	10	0	0.00%	0
PUBLIC	751	0	3	2.40%	3
TREE	103	194	57	45.60%	6
UNKNOWN	0	19	0	0.00%	0

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) One incident accounted for 81% of the customer interruptions on this circuit in 2019. Two spans of #6 Cu primary had broken and a switch was damaged. Repairs were completed and power restored on OAS 191800678. No additional work is required at this time. A full cycle tree trim is scheduled in 2020. (2018) Two incidents caused 92% of the customer interruptions in 2018. One was due to a public vehicle incident resulting in two broken poles and downed primary that was repaired under work request 21MT707936. The second was due to a failed transformer. The transformer was replaced and customers were restored under work request 21MT699724. No further work is planned.

#### Corrective Actions Planned

A broken tree during a storm damaged primary wire and a transformer causing customer outages. Tree limbs were removed from primary and the transformer and damaged primary were replaced. The circuit was inspected and no further action is needed. A full cycle tree trim was completed in 2020 and an underground visual inspection will be completed in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 266055  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63044, 63045  
**Customers Served:** 89  
**Customer Interruptions (CI):** 4  
**SAIFI Value:** Y2018 - 1.99; Y2019 - 2.11; Y2020 - 0.04  
**SAIDI Value:** 3

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	0	0	2	50.00%	1
CUSTOMER	0	0	0	0.00%	0
EMPLOYEES	0	50	0	0.00%	0
EQUIPMENT/OH	2	138	0	0.00%	0
EQUIPMENT/UG	152	0	2	50.00%	1
PUBLIC	0	0	0	0.00%	0
UNKNOWN	1	0	0	0.00%	0

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Two incidents caused 73% of the customer interruptions in 2019 and were caused by overhead malfunctions. Another incident caused 25% of the customer interruptions and was due to an operating error during planned switching. An engineering review and patrol of the circuit is planned for 2020 to ensure all switch labels in the field are accurate compared to the circuit map. A mid-cycle tree trim is scheduled in 2020. (2018) The largest outage occurred in December due to a switching error that damaged underground cable and a switchgear. The cable and switchgear were repaired under OAS 183392272. The second largest outage occurred in June when an underground switchgear and an underground lateral failed simultaneously. The switchgear and cable were replaced under work request 21MT699423. No further corrective actions are recommended at this time.

#### Corrective Actions Planned

Circuit 266055 is a Multi-year Worst Performing Circuit based on 2018 and 2019 performance. No further actions are required at this time. An underground visual inspection will be completed in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 279053  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63005, 63017, 63141  
**Customers Served:** 490  
**Customer Interruptions (CI):** 157  
**SAIFI Value:** Y2018 - 2.12; Y2019 - 4.10; Y2020 - 0.32  
**SAIDI Value:** 75

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	4	22	11	7.01%	6
EQUIPMENT/OH	26	129	21	13.38%	2
EQUIPMENT/UG	488	54	50	31.85%	9
LIGHTNING	0	7	0	0.00%	0
OTHER	0	3	0	0.00%	0
PUBLIC	487	2	0	0.00%	0
TREE	0	1749	53	33.76%	3
UNKNOWN	6	27	22	14.01%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Two broken tree incidents account for 81% of the customer interruptions in 2019. SCADA reclosers were installed in December 2019 on Work Request 21MT729803 for a section the circuit on private property in a wooded area West of Conway Village Drive. A SMART Energy project is planned for 2021 to relocate this section of overhead to underground. Fuses will be installed at several directly tapped transformers on the circuit backbone on Work Request 21MT739937. A full cycle tree trim was completed in 2019. (2018) Approximately 55% of customer interruptions were due to a private contractor dropping a tree into the circuit backbone. Additional faulted circuit indicators will be added to the circuit backbone to aid restoration under work request 21MT716020.

#### Corrective Actions Planned

Customer interruptions had many factors but tree outages (34%) and underground equipment (32%) were the largest contributors. A SMART Energy Project (Work Request 21MT720265) will relocate a large section of the overhead circuit to underground in the Conway Village area. This removes a lot of tree exposure for the circuit. Underground equipment issues included various causes. Issues were repaired or replaced as they occurred. No additional work is planned beyond the SMART Energy Project. Underground detailed and groundline inspections will be completed in 2021. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 459051  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63841, 63851  
**Customers Served:** 669  
**Customer Interruptions (CI):** 166  
**SAIFI Value:** Y2018 - 2.09; Y2019 - 3.17; Y2020 - 0.25  
**SAIDI Value:** 26

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	37	4	6	3.61%	5
EMPLOYEES	0	0	0	0.00%	0
EQUIPMENT/OH	18	2020	70	42.17%	6
EQUIPMENT/UG	0	0	23	13.86%	2
LIGHTNING	0	1	3	1.81%	3
OTHER	2	0	4	2.41%	2
OVERLOAD	0	0	0	0.00%	0
PUBLIC	2	0	0	0.00%	0
TREE	676	102	60	36.14%	2
UNKNOWN	671	0	0	0.00%	0

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Four incidents, two each on two separate days, caused 94% of the customer interruptions in 2019. The first two resulted from the primary conductor burning down at two different hot line clamps during cold and icy weather. The second two resulted from a burnt jumper and failed switches. A full cycle trim is scheduled in 2020. No other work is planned in 2020. (2018) Additional reclosers will be installed to isolate outages and also re-coordinate fuse sizes to improve circuit operation under work request 2TSE123847 in 2019.

#### Corrective Actions Planned

A full cycle trim was completed in 2020. An overhead visual inspection will be performed in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy. No other work is planned in 2021.





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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 553057  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63016, 63050, 63066  
**Customers Served:** 594  
**Customer Interruptions (CI):** 851  
**SAIFI Value:** Y2018 - 2.79; Y2019 - 3.15; Y2020 - 1.43  
**SAIDI Value:** 165

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	27	5	11	1.29%	4
CUSTOMER	0	0	0	0.00%	0
EQUIPMENT/OH	710	10	163	19.15%	5
EQUIPMENT/UG	2	0	0	0.00%	0
LIGHTNING	1	0	0	0.00%	0
PUBLIC	0	1183	1	0.12%	1
TREE	888	643	674	79.20%	7
UNKNOWN	13	18	2	0.24%	1

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) In 2019 there were two significant public vehicle accidents that accounted for 64% of the customer interruptions. The other large contributor (32%) was caused by a tree that fell resulting in a circuit outage with significant damage. These three incidents account for 96% of the total customer interruptions. A tap on Shelle Estates Drive experienced two outages caused by tree contact. A TripSaver or a recloser will be installed on this tap. Overhead visual and underground visual inspections are scheduled in 2020. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy. (2018) In 2018 two major outages resulted in a large majority of the customer outages. In January a 34kV insulator broke during a period of freezing rain which caused the 34kV conductor to fall onto the underbuilt 12kV circuit. In June a public vehicle accident caused another circuit outage.

#### Corrective Actions Planned

Over 90% of the outages on this circuit were due to tree related issues. A project to replace 5 fuses with TripSavers will be completed to help mitigate prolonged outages caused by temporary contact/fault incidents.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 603005  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63701  
**Customers Served:** 97  
**Customer Interruptions (CI):** 8  
**SAIFI Value:** Y2018 - 2.20; Y2019 - 2.22; Y2020 - 0.08  
**SAIDI Value:** 2

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
EQUIPMENT/OH	1	22	8	100.00%	2
LIGHTNING	116	96	0	0.00%	0
OTHER	89	0	0	0.00%	0
TREE	10	3	0	0.00%	0
UNKNOWN	0	97	0	0.00%	0

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) Two incidents caused 88% of the customer interruptions in 2019. The circuit was patrolled for the first incident and no cause could be determined. The second was during a thunderstorm and believed to have been caused by lightning. Additional reclosers will be installed on this circuit to isolate outages on work request 2TSE127240 in 2020. A full cycle tree trim was completed in 2019. Underground detailed and overhead groundline inspections were completed in 2019. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy. (2018) Insulators on steel crossarms were replaced with 69kV poly post insulators to prevent flashover under work request 2TSE122161 in 2018. No other work is planned for 2019.

#### Corrective Actions Planned

This circuit performed exceptionally well in 2020 with a SAIFI of 0.08. No work is planned for 2021.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 629053  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63330, 63336, 63343, 63344  
**Customers Served:** 260  
**Customer Interruptions (CI):** 364  
**SAIFI Value:** Y2018 - 2.30; Y2019 - 5.96; Y2020 - 1.40  
**SAIDI Value:** 73

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	0	2	11	3.02%	4
CUSTOMER	0	6	0	0.00%	0
EMPLOYEES	0	1	0	0.00%	0
EQUIPMENT/OH	409	1134	335	92.03%	9
EQUIPMENT/UG	0	0	1	0.27%	1
LIGHTNING	69	57	3	0.82%	1
OTHER	0	0	0	0.00%	0
PUBLIC	0	0	0	0.00%	0
TREE	118	322	2	0.55%	2
UNKNOWN	0	10	12	3.30%	7

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2020) Lightning arresters added at three locations, fuses added on taps to transformers, and three reclosers added to the circuit were completed in 2020 under Work Requests 2WWZ190490, 196166, & 196168. (2019) There were four overhead malfunction incidents that account for 73% of the customer interruptions in 2019. A full cycle trim was completed in 2020. Fused switches were added to 18 single-phase transformers and one single-phase tap under Work Request 2WWZ190388. An overhead visual inspection was completed in 2019. Any repair work identified as a result of the inspection were completed in accordance with Ameren Missouri's infrastructure inspection policy.

#### Corrective Actions Planned

There was one overhead malfunction incident that accounted for approximately 80% of the customer interruptions in 2020. An underground detailed inspection is scheduled in 2021. Any repair work identified as a result of the inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy. A field review of the circuit was completed. One V-brace was found broken and one pole had significant lean and will be straightened or replaced under Work Request 2WWZ203101. This circuit was not on the 2020 Worst Performing Circuit list, but appeared on the multi-year list due to 2018 & 2019 performance.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 685053  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63801, 63867, 63868  
**Customers Served:** 475  
**Customer Interruptions (CI):** 565  
**SAIFI Value:** Y2018 - 1.93; Y2019 - 2.07; Y2020 - 1.19  
**SAIDI Value:** 57

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	56	66	55	9.73%	9
CUSTOMER	0	0	0	0.00%	0
EQUIPMENT/OH	349	862	27	4.78%	8
EQUIPMENT/UG	33	20	2	0.35%	1
LIGHTNING	0	2	0	0.00%	0
OTHER	0	1	0	0.00%	0
PUBLIC	503	0	479	84.78%	4
TREE	0	36	2	0.35%	2
UNKNOWN	1	0	0	0.00%	0

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2019) A circuit outage due to failed primary conductor caused 48% of the customer interruptions in 2019. A project to install additional three phase reclosers to better isolate outages will be completed on work requests 2TSE 127245, 127249 & 127250 in 2020. (2018) Circuit storm hardening was performed under work request 2TSE118506 in 2018. No other work was planned for 2019.

#### Corrective Actions Planned

A circuit outage occurred on November 2 as a result of a public vehicle striking a pole and accounted for 83% of the customer interruptions in 2020. Underground detailed and overhead visual inspections will be completed in 2021. Any repair work identified as a result of the inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy. No other work is planned for 2021.



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### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 783053  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63334, 63359  
**Customers Served:** 1160  
**Customer Interruptions (CI):** 311  
**SAIFI Value:** Y2018 - 2.59; Y2019 - 2.71; Y2020 - 0.27  
**SAIDI Value:** 27

#### Outage Analysis

Causes	2018 Total CI	2019 Total CI	2020 Total CI	2020 % Total CI	2020 # Incidents
ANIMAL	23	14	135	43.41%	17
CUSTOMER	2	0	0	0.00%	0
EMPLOYEES	1	0	0	0.00%	0
EQUIPMENT/OH	2386	2388	52	16.72%	11
EQUIPMENT/UG	0	2	0	0.00%	0
LIGHTNING	155	24	106	34.08%	9
OTHER	0	0	2	0.64%	1
PUBLIC	172	1	9	2.89%	2
TREE	226	310	2	0.64%	2
UNKNOWN	0	404	5	1.61%	3

Corrective actions taken or planned are noted below. These actions were developed through any combination of engineering reviews, circuit patrols, circuit inspections, and trimming. Circuit inspections and trimming are conducted on an appropriate cycle per rules 4 CSR 240-23.020 and 4 CSR 240.23-030 respectively.

#### Corrective Actions Taken

(2020) A project to add lightning arresters at one location along Hwy 161 was completed under Work Request 2WWZ196539. One fuse switch was replaced with a Trip Saver under Work Request 2WWZ195537. Another project to reconductor 5 spans of 3-phase 12.5kV overhead circuit along Old Hwy 61 was completed under Work Request 2WWZ190943.

(2019) Overhead equipment malfunctions during two separate storms accounted for 73% of the 2019 customer interruptions. Two projects to add lightning arresters at 3 locations along Hwy 161 are planned for 2020 under Work Requests 2WWZ196539 and 196542. One fuse switch will be replaced with a Trip Saver in 2020 under Work Request 2WWZ195537. Also, a project to reconductor 5 spans of 3-phase 12.5kV overhead circuit along Old Hwy 61 will be completed in 2020 under work request 2WWZ190943. A full cycle tree trim was completed in 2019. (2018) Three projects, Work Requests 2WWZ189410, 190459, and 190462, to add fuse switches on taps and transformers at 22 locations and replace one fuse switch with a Trip Saver switch in Bowling Green were completed in 2019. Work Request 2WWZ194197 to add 3 lightning arresters along Pike 334 and Work Request 2WWZ190290 to replace a solid-blade switch with a 12.5kV Interruption DA device were completed in 2019.

#### Corrective Actions Planned



## **APPENDIX D**

Four animal caused incidents, two overhead equipment malfunctions, and one lightning caused event accounted for 80% of the 2020 customer interruptions. One fuse switch on a tap from 3-phase circuit along Hwy 161 is planned to be replaced with a Trip Saver in 2021 under Work Request 2WWZ202526. Two new Intellirupter recloser devices are planned to be installed in Bowling Green in 2021 under Work Request 2WWZ196371. A set of 3 lightning arresters are planned to be added at three locations along Hwy 161 in 2021 under Work Requests 2WWZ196542 & 2WWZ200085. This circuit was not on the 2020 WPC list, but was on the multi-year list due to 2018 & 2019 performance.