



## Ameren Missouri 4 CSR 240-23.010 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 2015 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 filled, 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 1366-2003, 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.

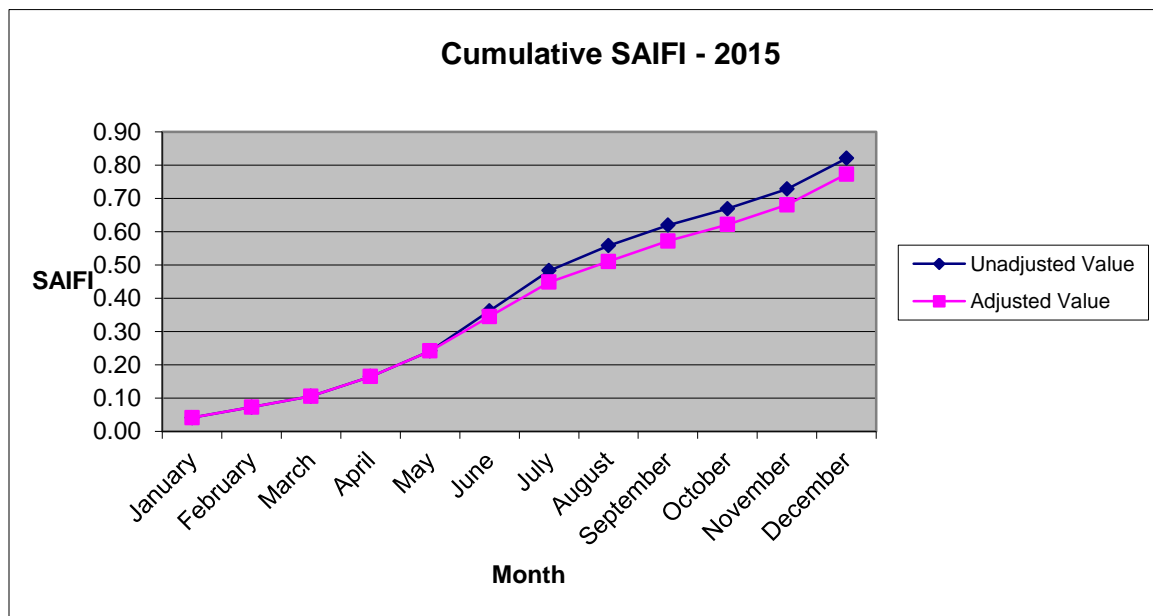


## Reliability Metrics

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 1366-2003, Guide for Electric Power Distribution Reliability Indices.” The following tables and graphs show Ameren Missouri’s unadjusted and adjusted reliability metrics for calendar year 2015:

SAIFI:

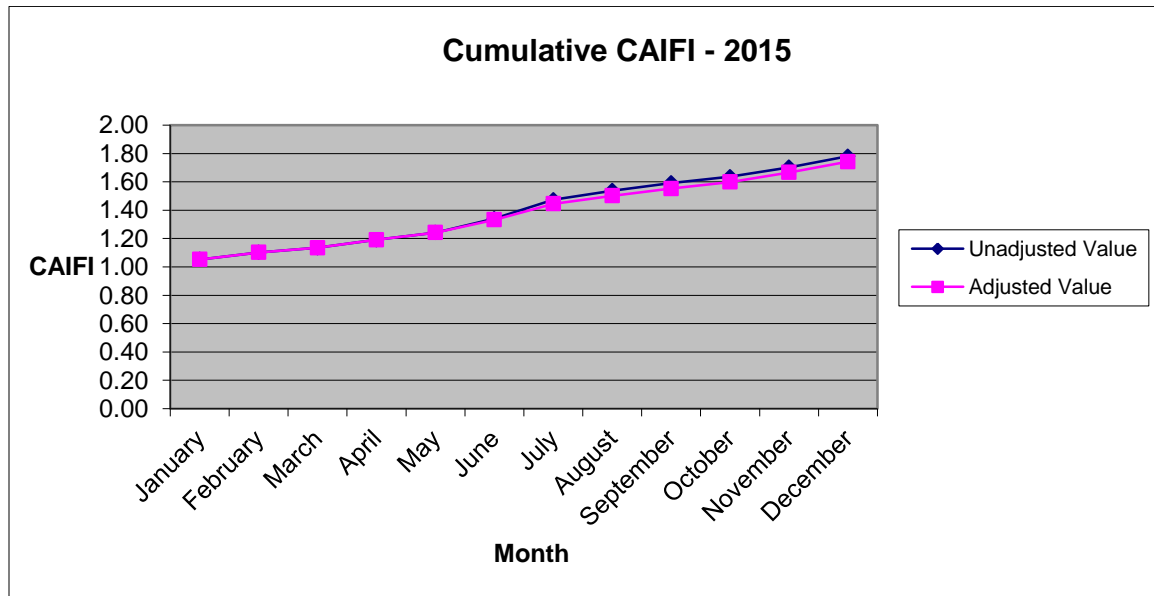
Month	Unadjusted Value	Adjusted Value
January	0.04	0.04
February	0.07	0.07
March	0.11	0.11
April	0.16	0.16
May	0.24	0.24
June	0.36	0.35
July	0.48	0.45
August	0.56	0.51
September	0.62	0.57
October	0.67	0.62
November	0.73	0.68
December	0.82	0.77





CAIFI:

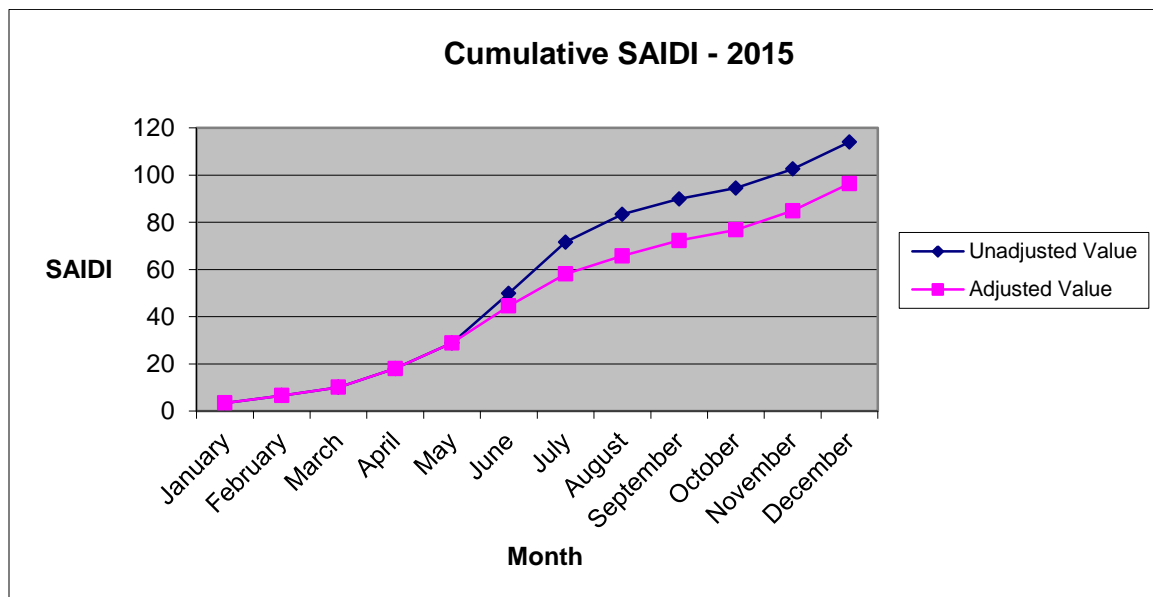
Month	Unadjusted Value	Adjusted Value
January	1.05	1.05
February	1.10	1.10
March	1.14	1.14
April	1.19	1.19
May	1.24	1.24
June	1.34	1.33
July	1.47	1.45
August	1.54	1.50
September	1.59	1.55
October	1.64	1.60
November	1.70	1.67
December	1.78	1.74





SAIDI:

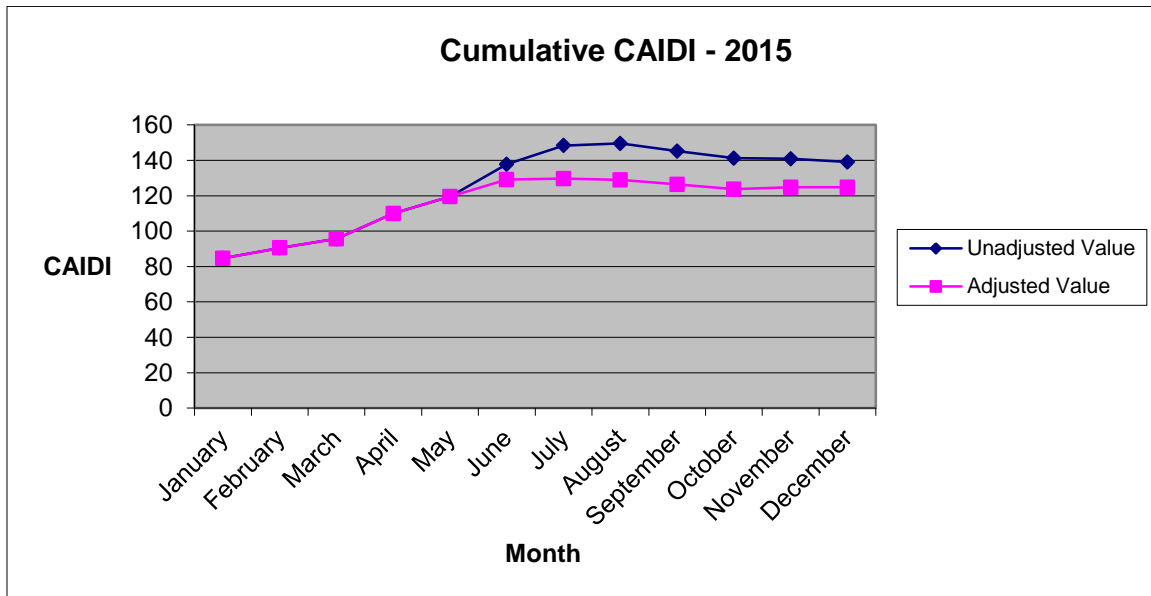
Month	Unadjusted Value	Adjusted Value
January	3	3
February	7	7
March	10	10
April	18	18
May	29	29
June	50	45
July	72	58
August	83	66
September	90	72
October	95	77
November	103	85
December	114	96





CAIDI:

Month	Unadjusted Value	Adjusted Value
January	85	85
February	91	91
March	96	96
April	110	110
May	120	120
June	138	129
July	148	130
August	150	129
September	145	126
October	141	124
November	141	125
December	139	125





### Ameren Missouri 2015 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 2015 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 2015 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 "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 2015 WPC list

The MWPCs circuits not identified as WPCs in 2015 but which were WPCs in 2013 and 2014 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 2015. The reported reliability metrics demonstrate continued improvement in the reliability of Ameren Missouri's electric distribution system. With an adjusted SAIFI value of .81, 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 A

DIVISION	OPERATING AREA	CIRCUIT	VOLT	CUSTOMERS	CI	CMI	SAIFI	SAIDI	2013	2014	2015	Years WPC
GATEWAY	BERKELEY	144051	12	88	762	13314	8.66	17			WPC	1
SEMO	HAYTI	456055	12	92	641	118746	6.97	185		WPC	WPC	2
ARCHVIEW	GERALDINE	164007	4	816	3887	410856	4.76	106			WPC	1
SEMO	DEXTER	685053	12	506	2374	300251	4.69	126		WPC	WPC	2
GATEWAY	BERKELEY	140001	4	411	1745	22616	4.25	13			WPC	1
CENTRAL MO	EXCELSIOR SPRINGS	760051	13	401	1535	163286	3.83	106			WPC	1
SEMO	POTOSI	477051	12	190	720	145147	3.79	202	WPC		WPC	2
MERAMEC VALLEY	ELLISVILLE	279051	12	195	726	156090	3.72	215			WPC	1
GATEWAY	DORSETT	258052	12	576	2097	327089	3.64	156			WPC	1
GATEWAY	BERKELEY	134052	12	741	2551	332057	3.44	130			WPC	1
MERAMEC VALLEY	JEFFERSON	168052	12	824	2787	148778	3.38	53			WPC	1
MERAMEC VALLEY	JEFFERSON	195054	12	1030	3413	298413	3.31	87	WPC		WPC	2
GATEWAY	ST CHARLES	565054	12	516	1699	298363	3.29	176			WPC	1
ARCHVIEW	GERALDINE	083005	4	84	274	36754	3.26	134			WPC	1
ARCHVIEW	MACKENZIE	196003	4	421	1361	56084	3.23	41			WPC	1
SEMO	DEXTER	698003	4	294	946	92057	3.22	97			WPC	1
GATEWAY	BERKELEY	130004	4	710	2284	254229	3.22	111			WPC	1
ARCHVIEW	GERALDINE	188001	4	344	1096	156360	3.19	143			WPC	1
CENTRAL MO	EXCELSIOR SPRINGS	718051	12	157	498	34004	3.17	68			WPC	1
SEMO	CAPE GIRARDEAU	646055	12	1327	4190	308040	3.16	74			WPC	1
GATEWAY	DORSETT	258058	12	643	2019	115055	3.14	57			WPC	1
CENTRAL MO	MOBERLY	914059	7	98	306	34845	3.12	114			WPC	1
ARCHVIEW	GERALDINE	317010	4	470	1458	146696	3.10	101			WPC	1
NORTHEAST MO	KIRKSVILLE	753053	4	81	251	59931	3.10	239			WPC	1
ARCHVIEW	GERALDINE	128005	4	664	2055	160507	3.09	78			WPC	1
NORTHEAST MO	KIRKSVILLE	851051	13	125	379	46556	3.03	123			WPC	1
CENTRAL MO	EXCELSIOR SPRINGS	717051	12	1133	3434	246478	3.03	72			WPC	1
ARCHVIEW	MACKENZIE	223055	12	707	2118	165226	3.00	78			WPC	1
GATEWAY	BERKELEY	167052	12	622	1843	233287	2.96	127	WPC		WPC	2
GATEWAY	BERKELEY	107003	4	514	1479	383952	2.88	260			WPC	1
ARCHVIEW	MACKENZIE	015006	4	337	969	81595	2.88	84			WPC	1
SEMO	CAPE GIRARDEAU	828056	12	312	893	124545	2.86	139			WPC	1
ARCHVIEW	MACKENZIE	194051	12	1558	4420	506177	2.84	115			WPC	1
SEMO	ST FRANCOIS	161055	12	535	1489	224892	2.78	151			WPC	1
ARCHVIEW	MACKENZIE	151001	4	477	1324	89106	2.78	67			WPC	1
ARCHVIEW	MACKENZIE	223054	12	1100	3027	237662	2.75	79			WPC	1
ARCHVIEW	GERALDINE	219003	4	374	1029	267021	2.75	259			WPC	1
MERAMEC VALLEY	ELLISVILLE	217052	12	293	805	122841	2.75	153			WPC	1
GATEWAY	ST CHARLES	566051	12	518	1419	526147	2.74	371		WPC	WPC	2
SEMO	DEXTER	690057	12	609	1636	169193	2.69	103			WPC	1



## APPENDIX A

GATEWAY	DORSETT	117056	12	1640	4401	242369	2.68	55			WPC	1
GATEWAY	DORSETT	209055	12	255	660	112221	2.59	170	WPC		WPC	2
NORTHEAST MO	LOUISIANA	629051	12	484	1246	145440	2.57	117			WPC	1
GATEWAY	BERKELEY	107006	4	860	2207	398567	2.57	181		WPC	WPC	2
MERAMEC VALLEY	ELLISVILLE	115052	12	1698	4323	823465	2.55	190			WPC	1
MERAMEC VALLEY	JEFFERSON	560053	12	1421	3616	363755	2.54	101			WPC	1
NORTHEAST MO	WENTZVILLE	665053	12	337	854	37852	2.53	44			WPC	1
SEMO	CAPE GIRARDEAU	646052	12	958	2353	238833	2.46	102			WPC	1
GATEWAY	DORSETT	139007	4	476	1154	96710	2.42	84			WPC	1
UNDERGROUND	UNDERGROUND	294057	13	12	29	8708	2.42	300		WPC	WPC	2
MERAMEC VALLEY	JEFFERSON	546051	12	579	1394	419669	2.41	301	WPC		WPC	2
ARCHVIEW	MACKENZIE	136052	12	689	1643	449120	2.38	273		WPC	WPC	2
SEMO	HAYTI	457055	12	437	1031	217096	2.36	211		WPC	WPC	2
MERAMEC VALLEY	ELLISVILLE	282051	12	1024	2374	244630	2.32	103			WPC	1
CENTRAL MO	JEFFERSON CITY	856052	12	388	898	268034	2.31	298	WPC		WPC	2
NORTHEAST MO	KIRKSVILLE	986001	4	308	712	29156	2.31	41			WPC	1
ARCHVIEW	MACKENZIE	223051	12	1317	3041	449620	2.31	148	WPC		WPC	2
GATEWAY	ST CHARLES	544055	12	855	1974	111309	2.31	56			WPC	1
NORTHEAST MO	WENTZVILLE	652055	12	985	2274	246666	2.31	108			WPC	1
NORTHEAST MO	KIRKSVILLE	852051	13	193	445	64343	2.31	145			WPC	1
ARCHVIEW	GERALDINE	086007	4	746	1676	184310	2.25	110		WPC	WPC	2
GATEWAY	DORSETT	247054	12	322	716	160295	2.22	224		WPC	WPC	2
NORTHEAST MO	LOUISIANA	616008	4	195	431	135079	2.21	313			WPC	1
CENTRAL MO	EXCELSIOR SPRINGS	718053	12	670	1478	138758	2.21	94			WPC	1
ARCHVIEW	GERALDINE	268004	4	445	981	52716	2.20	54			WPC	1
MERAMEC VALLEY	ELLISVILLE	282058	12	1260	2773	317275	2.20	114			WPC	1
MERAMEC VALLEY	JEFFERSON	168053	12	1026	2256	103326	2.20	46			WPC	1
MERAMEC VALLEY	FRANKLIN	127053	12	939	2046	327842	2.18	160			WPC	1
ARCHVIEW	MACKENZIE	194056	12	1681	3652	1004581	2.17	275	WPC		WPC	2
MERAMEC VALLEY	ELLISVILLE	165056	12	155	336	91839	2.17	273		WPC	WPC	2
GATEWAY	BERKELEY	047005	4	371	803	53396	2.16	66			WPC	1
MERAMEC VALLEY	FRANKLIN	506055	12	522	1121	397510	2.15	355			WPC	1
NORTHEAST MO	LOUISIANA	672051	12	212	455	29202	2.15	64			WPC	1
SEMO	DEXTER	698007	4	117	250	22210	2.14	89			WPC	1
SEMO	HAYTI	452053	12	287	612	146656	2.13	240		WPC	WPC	2
NORTHEAST MO	KIRKSVILLE	940051	12	236	502	99906	2.13	199			WPC	1
NORTHEAST MO	WENTZVILLE	652053	12	595	1264	93302	2.12	74			WPC	1
MERAMEC VALLEY	JEFFERSON	551053	12	1104	2342	81153	2.12	35			WPC	1
MERAMEC VALLEY	ELLISVILLE	282053	12	1946	4125	734646	2.12	178			WPC	1
NORTHEAST MO	WENTZVILLE	389052	12	1511	3200	158685	2.12	50			WPC	1
ARCHVIEW	MACKENZIE	273056	12	398	836	70335	2.10	84			WPC	1
GATEWAY	BERKELEY	229056	12	1140	2385	631636	2.09	265	WPC		WPC	2

## APPENDIX A

SEMO	HAYTI	465051	12	522	1091	102701	2.09	94			WPC	1
CENTRAL MO	JEFFERSON CITY	977052	14	417	870	246449	2.09	283			WPC	1
MERAMEC VALLEY	FRANKLIN	506056	12	892	1853	303588	2.08	164			WPC	1
SEMO	DEXTER	656055	12	1008	2092	294076	2.08	141			WPC	1
ARCHVIEW	GERALDINE	317001	4	751	1555	94497	2.07	61			WPC	1
MERAMEC VALLEY	ELLISVILLE	295056	12	581	1201	170932	2.07	142			WPC	1
GATEWAY	DORSETT	266051	12	84	173	21477	2.06	124			WPC	1
CENTRAL MO	EXCELSIOR SPRINGS	780001	4	236	486	67079	2.06	138			WPC	1
NORTHEAST MO	LOUISIANA	731051	12	323	665	67798	2.06	102			WPC	1
SEMO	POTOSI	451054	13	321	659	408330	2.05	620	WPC		WPC	2
NORTHEAST MO	KIRKSVILLE	852052	13	407	834	173057	2.05	208			WPC	1
ARCHVIEW	GERALDINE	017010	4	236	482	37322	2.04	77			WPC	1
SEMO	DEXTER	878003	4	120	245	16510	2.04	67			WPC	1
ARCHVIEW	GERALDINE	238001	4	625	1275	161577	2.04	127			WPC	1
MERAMEC VALLEY	FRANKLIN	179051	12	1068	2166	185663	2.03	86			WPC	1
SEMO	HAYTI	465056	12	171	346	26830	2.02	78			WPC	1
ARCHVIEW	MACKENZIE	034009	4	473	953	172456	2.01	181			WPC	1
ARCHVIEW	MACKENZIE	024006	4	368	741	112345	2.01	152			WPC	1
NORTHEAST MO	LOUISIANA	616004	4	235	473	23163	2.01	49			WPC	1
SEMO	CAPE GIRARDEAU	635001	4	770	1547	232175	2.01	150			WPC	1
NORTHEAST MO	KIRKSVILLE	858052	12	1	2	109	2.00	55			WPC	1
SEMO	POTOSI	488052	12	438	875	114608	2.00	131			WPC	1
NORTHEAST MO	WENTZVILLE	645051	12	328	655	35475	2.00	54			WPC	1
ARCHVIEW	MACKENZIE	271055	12	1696	3358	690132	1.98	206			WPC	1
NORTHEAST MO	WENTZVILLE	673053	12	633	1246	233437	1.97	187	WPC		WPC	2
NORTHEAST MO	KIRKSVILLE	951002	4	31	61	5307	1.97	87			WPC	1
ARCHVIEW	GERALDINE	171004	4	275	540	114012	1.96	211			WPC	1
MERAMEC VALLEY	JEFFERSON	559051	12	668	1304	747528	1.95	573		WPC	WPC	2
ARCHVIEW	GERALDINE	083001	4	428	835	102473	1.95	123			WPC	1



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 015006  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63109, 63116, 63139  
**Customers Served:** 342  
**Customer Interruptions (CI):** 969  
**SAIFI Value:** 2.83  
**SAIDI Value:** 84

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
CUSTOMER	1	< 0.01%	1
EQUIPMENT/OH	967	99.79%	6
TREES	1	< 0.01%	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

On February 12, 2015, during windy conditions primary conductors wrapped together resulting in two separate circuit outages. Crews repaired the loose fitting and the unnecessary slack was pulled out of the wire. No further actions are planned. Repair work identified as a result of the 2015 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:** 017010  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63104  
**Customers Served:** 238  
**Customer Interruptions (CI):** 482  
**SAIFI Value:** 2.03  
**SAIDI Value:** 77

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	1	< 0.01%	1
UNKNOWN	481	99.79%	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

All 9 incidents occurred on the same date, June 26, 2016. There was a thunderstorm in the area and the substation breaker tripped. A Troublemaker patrolled the circuit and found no problems. The breaker was reset and it held. Division engineering will investigate further. No corrective action possible at this time.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 024006  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63111  
**Customers Served:** 368  
**Customer Interruptions (CI):** 772  
**SAIFI Value:** 2.10  
**SAIDI Value:** 152

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	1	< 0.01%	1
EQUIPMENT/OH	571	73.96%	3
OTHER	13	1.68%	1
PREARRANGED	31	4.02%	2
TREES	156	20.21%	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 broken cross arm resulted in a circuit outage on June 19, 2015. The cross arm was replaced. No further actions are planned.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 034009  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63119, 63122  
**Customers Served:** 473  
**Customer Interruptions (CI):** 966  
**SAIFI Value:** 2.04  
**SAIDI Value:** 181

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EMPLOYEES	34	3.52%	2
EQUIPMENT/OH	869	89.96%	12
OTHER	6	< 0.01%	2
PREARRANGED	13	1.35%	4
PUBLIC	7	< 0.01%	1
TREES	37	3.83%	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

Outages were caused by downed primary wire at three different locations at three different times: on 5/31/15 with OAS# 151501201, on 6/21/15 with WR 21MT626453 and on 6/26/15 with OAS# 151767837. This was the cause of over 90% of the circuit's customer interruptions in 2015. A mid-cycle tree trim was completed on the circuit in 2015. Both overhead and underground visual inspections were also completed on the circuit in 2015.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 047005  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63130, 63133  
**Customers Served:** 371  
**Customer Interruptions (CI):** 803  
**SAIFI Value:** 2.16  
**SAIDI Value:** 66

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	3	< 0.01%	3
EQUIPMENT/UG	735	91.53%	2
OTHER	3	< 0.01%	1
TREES	41	5.11%	2
UNKNOWN	21	2.62%	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

The circuit is on the WPC list due to two circuit outages in 2015 both caused by failure of the underground circuit exit cable. There is approximately 1,800' of cable and 5 manholes from the substation to the terminal pole. The cable is mostly 800-3 PILC from 1965 with two pulls of 750-3X2-3 from 1986. Division engineering will monitor cable performance and if cable failures persist, recommend replacing all cable. Additional analysis found that transformer TLM # 02060500028 at 1529 Nixon Ave rear had 3 outages in 2015. Berkeley engineering will make field check to determine cause of outages and proper correction. This circuit will be trimmed in 2016 which should further reduce outages.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 083001  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63107, 63115, 63147  
**Customers Served:** 429  
**Customer Interruptions (CI):** 1275  
**SAIFI Value:** 2.97  
**SAIDI Value:** 123

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	818	64.16%	7
PREARRANGED	440	34.51%	2
PUBLIC	2	< 0.01%	2
TREES	15	1.18%	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

On April 3 there was a cable fault in a manhole that was repaired on WR 21MT621311. Then on Oct. 14, 2015 the cables failed between switchgear #2 and transformer #2. Simple repairs weren't able to be done, so the station was placed back in service, operating on just transformer #1 and all seven circuits were switched to that transformer. In Dec. of 2016 transformer #2 will be replaced and transformer #1 will be removed. In 2017 circuit 83-1 will be reconductored and circuits 83-5 and 8 will have new ties built to pick up load from adjacent substations. In 2018 both of the switchgear will be removed and a new five position switchgear will be installed with high side transfer.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 083005  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63147  
**Customers Served:** 84  
**Customer Interruptions (CI):** 360  
**SAIFI Value:** 4.29  
**SAIDI Value:** 134

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	156	43.33%	4
LIGHTNING	24	6.67%	1
PREARRANGED	86	23.89%	2
PUBLIC	93	25.83%	4
UNKNOWN	1	< 0.01%	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

On Oct. 14, 2015 cables failed between switchgear #2 and transformer #2. Simple repairs weren't able to be performed. The station was put back in service operating on just transformer #1 and all seven circuits were switched to that transformer. In Dec. of 2016 transformer #2 will be replaced and transformer #1 will be removed. In 2018 both switchgear lineups will be removed and a new five position switchgear will be installed with high-side transfer. In 2017 circuit 83-1 will be reconductored and circuits 83-5 and 8 will have new ties built in order to create additional opportunities to pick up load from adjacent substations.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 086007  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63101, 63103, 63106  
**Customers Served:** 750  
**Customer Interruptions (CI):** 1677  
**SAIFI Value:** Y2013 - 0.03; Y2014 - 2.06; Y2015 - 2.24  
**SAIDI Value:** 110

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	20	39	753	44.90%	4
EQUIPMENT/UG	0	1495	751	44.78%	1
LIGHTNING	0	0	166	9.90%	3
OTHER	1	0	2	< 0.01%	2
PREARRANGED	0	4	1	< 0.01%	1
PUBLIC	0	0	3	< 0.01%	1
UNKNOWN	2	0	1	< 0.01%	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

Three outages were responsible for nearly all of the CI during 2015. One was 751 CI caused by an underground cable failure in a manhole, ADMS M1013409. WR 21MT624504 was created to repair this failure. A second outage consisting of 743 CI was caused by a switch malfunction, ADMS order M1070717. A third outage consisted of 166 CI was caused by a lightening strike downing a 4kV line, ADMS order M1066211. All repairs associated with these outages were made at the time of the outage.

#### Corrective Actions Planned

No further actions are planned.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 107003  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63074, 63134  
**Customers Served:** 512  
**Customer Interruptions (CI):** 1479  
**SAIFI Value:** 2.89  
**SAIDI Value:** 260

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EMPLOYEES	10	< 0.01%	1
EQUIPMENT/OH	559	37.80%	7
OTHER	13	< 0.01%	2
TREES	764	51.66%	10
UNKNOWN	133	8.99%	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

Review of the outage data shows repeated issues due to trees. Many of the tree issues have affected the circuit backbone causing entire circuit outages. This circuit is scheduled to be trimmed in 2016. Tree trimming should correct the issues on this circuit. No further action is required at this time.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 107006  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63114, 63134  
**Customers Served:** 864  
**Customer Interruptions (CI):** 2321  
**SAIFI Value:** Y2013 - 0.34; Y2014 - 1.87; Y2015 - 2.69  
**SAIDI Value:** 181

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
EMPLOYEES	0	0	11	< 0.01%	1
EQUIPMENT/OH	4	976	856	36.88%	24
OTHER	0	1	49	2.11%	5
OVERLOAD	49	0	0	0.00%	0
PREARRANGED	36	594	114	4.91%	9
PUBLIC	0	0	5	< 0.01%	1
TREES	162	35	994	42.83%	18
UNKNOWN	43	2	292	12.58%	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 Taken

WR 21MT620752 was completed in December 2015. This project added fuses to isolate outages and replaced some existing fuse sizes in order to coordinate with upstream and downstream protection. Additionally pole # 3064667 was replaced due to wood decay.

#### Corrective Actions Planned

The 2015 and 2014 outages on the circuit were largely tree-related. This circuit is scheduled to be trimmed in 2016. Additional fuse work was completed in December of 2015 which should improve the circuit reliability in 2016. Due to this circuit being on the WPC list for a second year in a row, Berkeley engineering will patrol this circuit in to determine if additional step can be taken to improve reliability.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 115052  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63011, 63017, 63021  
**Customers Served:** 1706  
**Customer Interruptions (CI):** 4589  
**SAIFI Value:** 2.69  
**SAIDI Value:** 190

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	61	1.33%	3
CUSTOMER	9	< 0.01%	1
EQUIPMENT/OH	2123	46.26%	12
EQUIPMENT/UG	1983	43.21%	14
PREARRANGED	266	5.80%	28
TREES	24	< 0.01%	2
UNKNOWN	123	2.68%	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

Lengthy circuit outages associated with cable faults along Holloway Road, south of Baxter Road were the major source of customer minutes out. High-visibility "Navigator" faulted circuit indicators will be installed in the overhead sections upstream and downstream of this underground circuit section to assist in the engineering analysis. Faulted circuit indicators will be replaced in the series of pad mounted switchgear on this circuit. The work will be performed on WR 21MT644345. Cycle tree trimming is planned for 2016.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 117056  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63043, 63044, 63143  
**Customers Served:** 1642  
**Customer Interruptions (CI):** 4422  
**SAIFI Value:** 2.69  
**SAIDI Value:** 55

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	113	2.56%	4
EMPLOYEES	42	< 0.01%	2
EQUIPMENT/OH	1733	39.19%	5
EQUIPMENT/UG	23	< 0.01%	2
LIGHTNING	1	< 0.01%	1
OTHER	1	< 0.01%	1
PREARRANGED	21	< 0.01%	4
PUBLIC	2432	55.00%	14
TREES	54	1.22%	5
UNKNOWN	2	< 0.01%	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

There were two circuit outages on this circuit in 2015. There is a midstream recloser on this circuit that should have prevented both of these circuit outages. The recloser settings will be reviewed and it will be inspected to determine why it didn't operate.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 127053  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63090  
**Customers Served:** 938  
**Customer Interruptions (CI):** 2049  
**SAIFI Value:** 2.18  
**SAIDI Value:** 160

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	20	< 0.01%	4
EQUIPMENT/OH	40	1.95%	4
PREARRANGED	3	< 0.01%	1
TREES	1929	94.14%	5
UNKNOWN	57	2.78%	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 total circuit outages occurred due to trees. This circuit is scheduled to be trimmed on cycle in 2016. No further actions planned.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 128005  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63115, 63120, 63136  
**Customers Served:** 670  
**Customer Interruptions (CI):** 2096  
**SAIFI Value:** 3.13  
**SAIDI Value:** 78

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	44	2.10%	6
EQUIPMENT/UG	1982	94.56%	5
OTHER	3	< 0.01%	3
PREARRANGED	41	1.96%	7
PUBLIC	1	< 0.01%	1
TREES	24	1.15%	10
UNKNOWN	1	< 0.01%	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

Underground primary cable failed on August 12 and repairs were made August 16. Grounds were installed under WR 21MT629591 and 182 feet of cable was replaced under WR 21MT629829.





## 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:** 711  
**Customer Interruptions (CI):** 2286  
**SAIFI Value:** 3.22  
**SAIDI Value:** 111

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EMPLOYEES	12	< 0.01%	1
EQUIPMENT/OH	1400	61.24%	7
LIGHTNING	47	2.06%	1
OTHER	5	< 0.01%	5
PREARRANGED	2	< 0.01%	2
PUBLIC	717	31.36%	3
TREES	102	4.46%	10
UNKNOWN	1	< 0.01%	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

The division engineering performed several improvements on the circuits. Two crossarms were replaced under WR 21MT629206, overhead primary repaired at Marillac Dr under WR 21MT630250 and pole 238345 was replaced under WR 21MT632403. The circuit was patrolled this year. No further action is required.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 134052  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63031  
**Customers Served:** 740  
**Customer Interruptions (CI):** 2569  
**SAIFI Value:** 3.47  
**SAIDI Value:** 130

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	21	< 0.01%	1
EQUIPMENT/OH	1	< 0.01%	1
LIGHTNING	11	< 0.01%	2
PREARRANGED	18	< 0.01%	3
PUBLIC	1039	40.44%	3
TREES	1479	57.57%	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

Division engineering has scheduled circuit improvements for the third quarter of this year. The project provides for upgrading approximately 7600ft of two phase #2 ACSR and 3800ft of one phase #1/0 AA with 556AA conductor along Charbonier Rd. An additional 1670ft of #2 Cu and 3340 feet of #336 conductors will be upgraded to 556AA under WR 21MT612098. The conductor upgrade will increase tie capabilities and decrease customer-minutes of interruption for Howdershell 270-51 and Shackelford 134-52.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 136052  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63123, 63129  
**Customers Served:** 691  
**Customer Interruptions (CI):** 1671  
**SAIFI Value:** Y2013 - 0.27; Y2014 - 1.63; Y2015 - 2.42  
**SAIDI Value:** 273

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	9	10	0	0.00%	0
EQUIPMENT/OH	24	880	1253	74.99%	16
EQUIPMENT/UG	133	77	51	3.05%	3
LIGHTNING	19	1	0	0.00%	0
OTHER	0	0	50	2.99%	1
PREARRANGED	0	0	28	1.68%	2
PUBLIC	0	42	279	16.70%	3
TREES	2	42	9	< 0.01%	1
UNKNOWN	0	93	1	< 0.01%	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

The 300A solid blade switch was replaced in 2015 under WR 21MT617399, which had previously caused a circuit outage. A broken ground wire that came into contact with the primary conductors and resulted in a circuit outage was repaired. The primary conductors that had wrapped together during a non-public vehicle accident were repaired in 2015 under WR 21MT622093, which had previously caused a circuit outage.

#### Corrective Actions Planned

Division engineering personnel will patrol the circuit in 2016 to determine if any additional protection devices are needed.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 139007  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63119, 63124, 63144  
**Customers Served:** 478  
**Customer Interruptions (CI):** 1154  
**SAIFI Value:** 2.41  
**SAIDI Value:** 84

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	20	1.73%	2
EQUIPMENT/UG	26	2.25%	1
UNKNOWN	1108	96.01%	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

The cause of the interruptions could not be determined. Faulted circuit indicators were installed on switch D7795 (OAS#M1533624) and D6679 (OAS#M1533788) in order to better identify and locate the source of the outages.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 140001  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63132, 63141  
**Customers Served:** 409  
**Customer Interruptions (CI):** 1746  
**SAIFI Value:** 4.27  
**SAIDI Value:** 13

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	3	< 0.01%	3
EQUIPMENT/UG	1	< 0.01%	1
OTHER	1	< 0.01%	1
PREARRANGED	1	< 0.01%	1
TREES	1739	99.60%	2
UNKNOWN	1	< 0.01%	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

The circuit only had 5 customers interrupted in 2015 outside of June 19. The outages on June 19 were due to tree contact. This circuit was last trimmed in 2012 and is due for tree trimming in 2016. No further action is required.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 144051  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63042, 63044  
**Customers Served:** 89  
**Customer Interruptions (CI):** 765  
**SAIFI Value:** 8.60  
**SAIDI Value:** 17

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
CUSTOMER	2	< 0.01%	2
EQUIPMENT/OH	4	< 0.01%	1
EQUIPMENT/UG	6	< 0.01%	1
OTHER	748	97.78%	14
PREARRANGED	3	< 0.01%	3
UNKNOWN	2	< 0.01%	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

The circuit is on the WPC list due to an Aug 17th switching error. Outside of Aug 17th, the circuit had 6 customers interrupted on May 15th due to an underground cable fault. The faulted cable has been replaced. No further action is required.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 151001  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63123  
**Customers Served:** 477  
**Customer Interruptions (CI):** 1378  
**SAIFI Value:** 2.89  
**SAIDI Value:** 67

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EMPLOYEES	10	< 0.01%	1
EQUIPMENT/OH	59	4.28%	3
EQUIPMENT/UG	1254	91.00%	3
PREARRANGED	54	3.92%	4
PUBLIC	1	< 0.01%	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

A section of the circuit's feeder exit cable that had failed was replaced. This work was completed on WR 21MT627635 on 7/14/15. A circuit outage was taken on 7/18/15 to remove a metal awning in the backbone of the circuit. These two incidents were the cause of 91% of the circuit's customer interruptions in 2015.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 161055  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63640, 63651  
**Customers Served:** 535  
**Customer Interruptions (CI):** 1495  
**SAIFI Value:** 2.79  
**SAIDI Value:** 151

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	8	< 0.01%	7
EQUIPMENT/OH	818	54.72%	13
EQUIPMENT/UG	1	< 0.01%	1
LIGHTNING	3	< 0.01%	3
OTHER	1	< 0.01%	1
PREARRANGED	6	< 0.01%	3
PUBLIC	3	< 0.01%	1
TREES	651	43.55%	3
UNKNOWN	4	< 0.01%	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

The circuit was last trimmed in 2011, next scheduled cycle trim is 2017. Installation of additional fuses, animal guards, reclosers, and switches along with routine maintenance repairs will be completed in 2016 to further isolate and minimize outages. This work will be performed under WR 28SF040109. An engineering review of the circuit will be completed in 2016.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 164007  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63107, 63113, 63115  
**Customers Served:** 814  
**Customer Interruptions (CI):** 3913  
**SAIFI Value:** 4.81  
**SAIDI Value:** 106

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	9	< 0.01%	6
EQUIPMENT/UG	222	5.67%	1
PREARRANGED	26	< 0.01%	4
TREES	70	1.79%	8
UNKNOWN	3586	91.64%	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

On Dec. 28, 2015 the circuit breaker at the substation tripped. Troublemens patrolled the circuit and found no issues. The breaker was reset and it held. Division engineering will investigate further. No corrective action is possible at this time.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 165056  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63001, 63025, 63069  
**Customers Served:** 155  
**Customer Interruptions (CI):** 336  
**SAIFI Value:** Y2013 - 1.45; Y2014 - 1.85; Y2015 - 2.17  
**SAIDI Value:** 273

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	1	10	1	< 0.01%	1
EQUIPMENT/OH	56	0	1	< 0.01%	1
LIGHTNING	29	71	0	0.00%	0
OVERLOAD	0	104	0	0.00%	0
PREARRANGED	97	0	0	0.00%	0
PUBLIC	0	0	5	1.49%	1
TREES	36	0	322	95.83%	10
UNKNOWN	8	104	7	2.08%	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

An additional 100T fuse was installed at Wengler Rd and 4th Street under WR 21MT607133. The circuit was patrolled by engineering in August, 2014.

#### Corrective Actions Planned

Trees in a private property rear section of the circuit are the main issue. This is the section south of fuse SL33859821. Cycle tree trimming is planned for 2016.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 167052  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63033, 63136, 63137, 63138  
**Customers Served:** 624  
**Customer Interruptions (CI):** 1916  
**SAIFI Value:** Y2013 - 1.97; Y2014 - 0.09; Y2015 - 3.07  
**SAIDI Value:** 127

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	57	1	332	17.33%	4
CUSTOMER	1	0	0	0.00%	0
EQUIPMENT/OH	814	25	113	5.90%	4
EQUIPMENT/UG	1	0	56	2.92%	2
LIGHTNING	0	18	0	0.00%	0
OTHER	1	0	2	< 0.01%	2
PREARRANGED	25	0	73	3.81%	5
PUBLIC	0	13	0	0.00%	0
TREES	100	0	0	0.00%	0
UNKNOWN	208	0	1340	69.94%	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 Taken

This circuit underwent overhead circuit inspection last year. The remaining work to be performed this year is pole 154659 replacement under WR 21MT635605 and hardware repair/replacement under WR 21MT635606.

#### Corrective Actions Planned

The division engineering personnel performed an inspection of the circuit and several improvement opportunities were identified. A 50 kva transformer with 75 kva on pole 154659 will be replaced and a fused switch and animal guards installed under WR 21MT645042. A crossarm on pole 233119 will be replaced under WR 21MT645046.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 168052  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63028, 63047, 63050, 63065  
**Customers Served:** 825  
**Customer Interruptions (CI):** 2791  
**SAIFI Value:** 3.38  
**SAIDI Value:** 53

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	823	29.49%	7
CUSTOMER	1	< 0.01%	1
EQUIPMENT/OH	75	2.69%	2
LIGHTNING	817	29.27%	2
OTHER	10	< 0.01%	10
PREARRANGED	4	< 0.01%	3
TREES	9	< 0.01%	1
UNKNOWN	1052	37.69%	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

This circuit experienced three total circuit outages in 2015 resulting in 88% of the total customer interruptions. In investigating the root caused for the outages it was found that two of the events were caused by failure of single phase transformers located on the circuit's backbone. One transformer outage was caused by lightning and the other by animal contact. The third outage happened on a rainy morning and no cause was found. To reduce exposure on the circuit backbone, a three phase breakoff will have fuses installed on project 26JF134897 at existing solid blade switch J4191. There will also be an investigation at the substation to insure that the reclosing relays are operating properly to clear any temporary faults.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 168053  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63020, 63050  
**Customers Served:** 1026  
**Customer Interruptions (CI):** 2262  
**SAIFI Value:** 2.20  
**SAIDI Value:** 46

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	35	1.55%	2
EQUIPMENT/OH	46	2.03%	6
EQUIPMENT/UG	2	< 0.01%	1
LIGHTNING	2	< 0.01%	1
OTHER	2	< 0.01%	2
PREARRANGED	6	< 0.01%	4
TREES	120	5.31%	3
UNKNOWN	2049	90.58%	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

This circuit experienced two total circuit outages in 2015 resulting in 90% of the customer interruptions. The first occurred on May 17 and the second on June 8. The circuit was patrolled and no cause was found. The present configuration has sets of backbone reclosers in place to limit exposure. There will be an investigation at the substation to insure that the reclosing relays are operating properly to clear any temporary faults. One single phase tap has appeared on the Multiple Device Inspection list on this circuit. WR 26JF133177 to animal guard the single phase tap at Fuse 3774 will be completed to limit outages on this tap to 11 customers.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 171004  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63144  
**Customers Served:** 276  
**Customer Interruptions (CI):** 540  
**SAIFI Value:** 1.96  
**SAIDI Value:** 211

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/UG	539	99.81%	3
OTHER	1	< 0.01%	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

The UG cable failed in two incidents and was replaced on WR 21MT620985



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 179051  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63077  
**Customers Served:** 1065  
**Customer Interruptions (CI):** 2347  
**SAIFI Value:** 2.20  
**SAIDI Value:** 86

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	23	< 0.01%	5
CUSTOMER	3	< 0.01%	3
EQUIPMENT/OH	298	12.70%	43
PREARRANGED	135	5.75%	5
PUBLIC	1699	72.39%	9
TREES	65	2.77%	4
UNKNOWN	124	5.28%	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

Multiple incidents involving public damage which included one total circuit outage occurred during 2015. No remedial actions are planned.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 188001  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63130  
**Customers Served:** 342  
**Customer Interruptions (CI):** 1190  
**SAIFI Value:** 3.48  
**SAIDI Value:** 143

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	10	< 0.01%	4
EQUIPMENT/UG	343	28.82%	3
OTHER	8	< 0.01%	2
OVERLOAD	20	1.68%	1
PREARRANGED	94	7.90%	3
PUBLIC	338	28.40%	3
TREES	8	< 0.01%	4
UNKNOWN	369	31.01%	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

Cable failed in a manhole causing two outages and was repaired on WR 21MT619061. The UG cable has six spans of lead and four spans of rubber and had three old joints which failed. They were replaced on WR 21MT623789. Additional cable damage caused by the “Loop Trolley Project” construction personal was repaired under claim # 0873X.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 194051  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63105, 63125, 63129  
**Customers Served:** 1555  
**Customer Interruptions (CI):** 4482  
**SAIFI Value:** 2.88  
**SAIDI Value:** 115

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	62	1.38%	4
EMPLOYEES	11	< 0.01%	1
EQUIPMENT/OH	4293	95.78%	10
OTHER	1	< 0.01%	1
PREARRANGED	62	1.38%	6
PUBLIC	4	< 0.01%	1
TREES	19	< 0.01%	4
UNKNOWN	30	< 0.01%	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

A transformer failure caused a circuit outage on July 26, 2015. The overhead transformer was hard-wired to the circuit back bone and not fused. The failed transformer was replaced and fuses installed. Repair work identified as a result of the 2015 inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy. No further actions are planned.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 194056  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63125  
**Customers Served:** 1679  
**Customer Interruptions (CI):** 3697  
**SAIFI Value:** Y2013 - 2.41; Y2014 - 1.17; Y2015 - 2.20  
**SAIDI Value:** 275

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	111	16	56	1.51%	4
CUSTOMER	0	1	0	0.00%	0
EQUIPMENT/OH	156	37	1981	53.58%	16
EQUIPMENT/UG	10	61	11	< 0.01%	2
LIGHTNING	138	0	0	0.00%	0
OTHER	1	0	571	15.44%	1
OVERLOAD	19	0	0	0.00%	0
PREARRANGED	0	57	45	1.22%	4
PUBLIC	3341	0	0	0.00%	0
TREES	131	1703	244	6.60%	9
UNKNOWN	131	81	789	21.34%	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

A large tree limb came into contact with the overhead primary conductors and caused a circuit outage on July 26, 2015. The overhead primary conductor was repaired on WR 21MT628519.

#### Corrective Actions Planned

Repair work identified as a result of the 2015 inspections will be completed in accordance with Ameren Missouri's infrastructure inspection policy. Division engineering personnel will patrol the circuit in 2016 to determine if any additional protective devices are needed.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 195054  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63028, 63050, 63065, 63070  
**Customers Served:** 1028  
**Customer Interruptions (CI):** 3413  
**SAIFI Value:** Y2013 - 1.86; Y2014 - 0.40; Y2015 - 3.32  
**SAIDI Value:** 87

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	3	1	4	< 0.01%	4
EQUIPMENT/OH	8	77	2192	64.23%	9
EQUIPMENT/UG	10	4	9	< 0.01%	4
LIGHTNING	745	0	1053	30.85%	1
OTHER	1	0	6	< 0.01%	2
PREARRANGED	0	13	0	0.00%	0
PUBLIC	1	131	16	< 0.01%	2
TREES	1140	46	133	3.90%	6
UNKNOWN	5	145	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

Overhead visual and underground detail inspections were both completed in 2013 with corrections made in 2014.

#### Corrective Actions Planned

Three circuit outages accounted for 92% of the 2015 customer interruptions. One circuit outage on June 12 was caused by lightning. The other two circuit outages were the result of a single incident on September 10 which occurred during a storm. A large tree fell and broke a cross arm on the three phase backbone. Two outages resulted from this incident due to the repair crew needing to take the circuit out an additional time for safety concerns. This circuit is scheduled for tree trimming in 2016. No additional actions are planned at this time.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 196003  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63119, 63143, 63144  
**Customers Served:** 423  
**Customer Interruptions (CI):** 1361  
**SAIFI Value:** 3.22  
**SAIDI Value:** 41

#### **Outage Analysis**

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	1360	99.93%	4
OTHER	1	< 0.01%	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**

A jumper that burned during switching was replaced. This work was completed on OAS# 152866753 on 10/13/15, to restore the circuit. Nearly all of this circuit's customer interruptions in 2015 were a result of this incident.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 209055  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63044, 63045  
**Customers Served:** 254  
**Customer Interruptions (CI):** 707  
**SAIFI Value:** Y2013 - 2.26; Y2014 - 0.14; Y2015 - 2.78  
**SAIDI Value:** 170

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	10	2	3	< 0.01%	2
CUSTOMER	0	1	2	< 0.01%	1
EQUIPMENT/OH	253	1	573	81.05%	14
EQUIPMENT/UG	0	1	0	0.00%	0
PREARRANGED	0	2	47	6.65%	8
TREES	252	0	36	5.09%	1
UNKNOWN	43	28	46	6.51%	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

An automatic recloser was installed on WR 21MT581694. Several outages occurred downstream of node 64215545(RSL44207713). Some of the causes were unknown. Division engineering and construction performed an inspection of the tap and several improvement opportunities were identified. These opportunities included replacing existing 100T fuses with a 140V4L recloser, reconductoring tap to 1/0AAAC, replacing crossarms, lightning arrestors and insulators. This work was done on WRs 21MT630341 and 21MT585276.

#### Corrective Actions Planned

The improvement opportunities identified on the above work requests were completed in November and December 2015. No outages have occurred since this work was completed. No additional improvements are planned for 2016.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 217052  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63005  
**Customers Served:** 293  
**Customer Interruptions (CI):** 810  
**SAIFI Value:** 2.76  
**SAIDI Value:** 153

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	305	37.65%	7
CUSTOMER	9	1.11%	1
EQUIPMENT/OH	177	21.85%	3
EQUIPMENT/UG	1	< 0.01%	1
LIGHTNING	1	< 0.01%	1
PREARRANGED	5	< 0.01%	2
PUBLIC	294	36.30%	2
TREES	1	< 0.01%	1
UNKNOWN	17	2.10%	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 circuit has tap sections that are not fused. Additional tap fusing and faulted circuit indicators will be installed to limit customer interruptions and minutes out, and aid in circuit restoration. This work will be performed under WR 21MT644347. Groundline and Overhead Visual Inspections are planned for 2016.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 219003  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63108, 63113  
**Customers Served:** 372  
**Customer Interruptions (CI):** 1081  
**SAIFI Value:** 2.91  
**SAIDI Value:** 259

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
CUSTOMER	17	1.57%	1
EQUIPMENT/OH	4	< 0.01%	3
OTHER	12	1.11%	2
PREARRANGED	52	4.81%	5
TREES	996	92.14%	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

Tree limbs falling on overhead primary caused outages on April 19 and July 1. The limbs were removed and nearby areas were patrolled. No further action is required.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 223051  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63123  
**Customers Served:** 1317  
**Customer Interruptions (CI):** 3091  
**SAIFI Value:** Y2013 - 1.50; Y2014 - 0.17; Y2015 - 2.35  
**SAIDI Value:** 148

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	72	30	91	2.94%	4
EQUIPMENT/OH	167	4	1531	49.53%	6
EQUIPMENT/UG	1	5	1323	42.80%	2
LIGHTNING	0	0	87	2.81%	1
PREARRANGED	184	11	50	1.62%	9
PUBLIC	1333	6	1	< 0.01%	1
TREES	125	169	7	< 0.01%	3
UNKNOWN	68	0	1	< 0.01%	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

A section of feeder exit cable that had failed was replaced. This work was completed on WR 21MT630494 on 9/1/15. This circuit outage accounted for 1315 of the 3091 customer interruptions (43%) in 2015. A failed B-phase jumper in the backbone was replaced to restore another large outage. This work was completed on OAS# 152224670 on 8/10/15. A mid-cycle tree trim was completed on this circuit in 2015. An underground visual inspection was also completed in 2015.

#### Corrective Actions Planned

As the result of circuit inspection of the circuit WRs 21MT644245, 21MT644246, and 21MT644247 were created to install fused switches at 5 different locations to better isolate portions of the circuit. The work is expected to be completed by 6/1/16.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 223054  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63042, 63123, 63125, 63128,  
**Customers Served:** 1101  
**Customer Interruptions (CI):** 3038  
**SAIFI Value:** 2.76  
**SAIDI Value:** 79

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	42	1.38%	7
EQUIPMENT/OH	1181	38.87%	6
EQUIPMENT/UG	1	< 0.01%	1
OTHER	6	< 0.01%	1
PREARRANGED	11	< 0.01%	4
PUBLIC	1622	53.39%	10
TREES	175	5.76%	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

A broken pole, four crossarms and two spans of primary was replaced after a car hit a pole on the north side of E Concord, west of Roundhill Dr. This work was completed on WR 21MT633649 on 10/16/15. This incident was the cause of 53% of the circuit's customer interruptions in 2015. A downed primary wire after a tree took it down at 14 Fawnwood PPR was replaced. This work was completed on WR 21MT623396 on 5/11/15. A pole and downed primary wire from another tree on PPR between Dorsie Dr and Valley Crest Dr was replaced on WR 21MT627655 on 7/24/15. A mid-cycle tree trim was completed on this circuit in 2015. An underground visual inspection was also completed on this circuit in 2015.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 223055  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63123, 63128  
**Customers Served:** 708  
**Customer Interruptions (CI):** 2131  
**SAIFI Value:** 3.01  
**SAIDI Value:** 78

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	9	< 0.01%	4
EMPLOYEES	40	1.88%	2
EQUIPMENT/OH	2022	94.89%	11
EQUIPMENT/UG	1	< 0.01%	1
OTHER	1	< 0.01%	1
PREARRANGED	13	< 0.01%	3
PUBLIC	12	< 0.01%	3
TREES	33	1.55%	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

A burnt jumper on the B-phase at the terminal pole from the feeder exit cable was replaced. This work was completed on OAS# 152225000 on 8/10/15 to restore the circuit. Nearly 95% of this circuit's customer interruptions in 2015 were a result of this incident. A mid-cycle tree trim was completed on this circuit in 2015. An underground visual inspection was also completed on this circuit in 2015.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 229056  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63031, 63034  
**Customers Served:** 1134  
**Customer Interruptions (CI):** 2406  
**SAIFI Value:** Y2013 - 2.09; Y2014 - 0.00; Y2015 - 2.12  
**SAIDI Value:** 265

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	0	1	1	< 0.01%	1
EQUIPMENT/OH	1	1	12	< 0.01%	1
EQUIPMENT/UG	2393	2	2370	98.50%	6
OTHER	0	0	1	< 0.01%	1
PREARRANGED	0	0	21	< 0.01%	2
UNKNOWN	1	0	1	< 0.01%	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

This circuit underwent underground corrective action last year. Complete guided boring was installed from X-TP,6049 to Y PAD 941 under WR 21MT631881 and underground primary cable was repaired from D-5455 and D-6058 under WR 21MT632027.

#### Corrective Actions Planned

A planned improvement will be performed under WR 21MT631988 which will provide for the replacement of 1600 ft direct buried 750AL(3) with 750 AL UG cable in conduit from D6169 to SWPD 6058, build two manholes and tree trimming.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 238001  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63133  
**Customers Served:** 625  
**Customer Interruptions (CI):** 1310  
**SAIFI Value:** 2.10  
**SAIDI Value:** 127

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/UG	630	48.09%	1
OTHER	1	< 0.01%	1
PREARRANGED	35	2.67%	5
TREES	11	< 0.01%	2
UNKNOWN	633	48.32%	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

Cable faulted inside the substation and was repaired on WR 21MT620332



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 247054  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63131  
**Customers Served:** 323  
**Customer Interruptions (CI):** 740  
**SAIFI Value:** Y2013 - 0.29; Y2014 - 1.61; Y2015 - 2.29  
**SAIDI Value:** 224

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	5	31	4	< 0.01%	3
CUSTOMER	0	1	0	0.00%	0
EMPLOYEES	0	0	5	< 0.01%	2
EQUIPMENT/OH	7	83	501	67.70%	9
EQUIPMENT/UG	0	326	12	1.62%	3
LIGHTNING	0	34	0	0.00%	0
PREARRANGED	0	20	24	3.24%	6
TREES	50	29	169	22.84%	8
UNKNOWN	33	0	25	3.38%	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 Taken

Several outages were due to bad reclosers and blown lightning arrestors. One recloser and two lightning arrestors were replaced on work requests 21MT635413 and 21MT624350. There were 3 tree related outages in 2014 and 8 in 2015. All of the tree related outages occurred before the maintenance tree trim was completed in September 2015 on OAS 151355265. One additional circuit outage was due to a blown porcelain pot head that was replaced on work request 21MT635014.

#### Corrective Actions Planned

A bypassed failed recloser will be replaced on work request 21MT644712.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 258052  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63026, 63088, 63122  
**Customers Served:** 577  
**Customer Interruptions (CI):** 2138  
**SAIFI Value:** 3.71  
**SAIDI Value:** 156

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	1	< 0.01%	1
EQUIPMENT/OH	29	1.36%	8
EQUIPMENT/UG	1	< 0.01%	1
OTHER	27	1.26%	1
PREARRANGED	41	1.92%	12
PUBLIC	577	26.99%	3
TREES	1460	68.29%	11
UNKNOWN	2	< 0.01%	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

An S&C "Intellirupter" recloser is proposed to be installed on the circuit to better sectionalize the circuit. Project is to be submitted internal review and with a planned installation in 2017.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 258058  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63026, 63038, 63122  
**Customers Served:** 639  
**Customer Interruptions (CI):** 2350  
**SAIFI Value:** 3.68  
**SAIDI Value:** 57

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	1	< 0.01%	1
CUSTOMER	10	< 0.01%	1
EQUIPMENT/OH	2	< 0.01%	2
EQUIPMENT/UG	27	1.15%	5
OTHER	4	< 0.01%	2
PREARRANGED	331	14.09%	15
TREES	1975	84.04%	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

A large tree outside of the ROW along a river bank fell and made contact with circuit. Forestry removed the tree. A Cycle Trim is planned for the circuit in 2016. No further action needed.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 266051  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63044, 63045  
**Customers Served:** 85  
**Customer Interruptions (CI):** 174  
**SAIFI Value:** 2.05  
**SAIDI Value:** 124

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
CUSTOMER	1	< 0.01%	1
EQUIPMENT/OH	87	50.00%	6
OTHER	1	< 0.01%	1
PREARRANGED	1	< 0.01%	1
TREES	84	48.28%	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 circuit outages occurred on this circuit in 2015. One outage was due to a large tree falling during rainy conditions. The tree was cleared and all primary repaired. A maintenance cycle tree trim was completed after this outage. The second circuit outage was due to a substation equipment failure. No corrective actions planned for 2016.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 268004  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63130  
**Customers Served:** 444  
**Customer Interruptions (CI):** 981  
**SAIFI Value:** 2.21  
**SAIDI Value:** 54

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EMPLOYEES	19	1.94%	1
EQUIPMENT/OH	910	92.76%	3
PUBLIC	5	< 0.01%	2
TREES	47	4.79%	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

An overhead primary conductor failed and was repaired. A faulted UG cable was repaired on WR 21MT626509



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 271055  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63026  
**Customers Served:** 1697  
**Customer Interruptions (CI):** 3431  
**SAIFI Value:** 2.02  
**SAIDI Value:** 206

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	4	< 0.01%	1
CUSTOMER	1	< 0.01%	1
EQUIPMENT/OH	70	2.04%	2
EQUIPMENT/UG	94	2.74%	10
PREARRANGED	73	2.13%	10
PUBLIC	3188	92.92%	8
TREES	1	< 0.01%	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

A broken pole that was hit by a vehicle at Hawkins Rd and Flora Del Dr was replaced. This work was completed on WR 21MT628880 on 8/1/16. A broken pole that was hit by a vehicle at 1829 Hawkins Rd was replaced. This work was completed on WR 21MT616906 on 1/15/16. Nearly 93% of this circuit's customer interruptions in 2015 were a result of these two vehicle incidents. A mid-cycle tree trim was completed on this circuit in 2015.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 273056  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63128  
**Customers Served:** 398  
**Customer Interruptions (CI):** 862  
**SAIFI Value:** 2.17  
**SAIDI Value:** 84

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	1	< 0.01%	1
EQUIPMENT/UG	809	93.85%	3
PREARRANGED	26	3.02%	2
TREES	26	3.02%	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 circuit outages caused 94% of the circuit interruptions in 2015. The two circuit outages were caused by problems with a primary-metered customer's switchgear and the primary cable (L-5819-2). The customer repaired their damaged circuit breaker and an Ameren underground construction crew repaired the cable terminations on WR 21MT621788 on 6/16/15.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 279051  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63006, 63017, 63141  
**Customers Served:** 196  
**Customer Interruptions (CI):** 735  
**SAIFI Value:** 3.75  
**SAIDI Value:** 215

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	14	1.90%	1
EQUIPMENT/OH	395	53.74%	3
EQUIPMENT/UG	5	< 0.01%	2
OTHER	7	< 0.01%	1
PREARRANGED	9	1.22%	1
TREES	303	41.22%	7
UNKNOWN	2	< 0.01%	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

Circuit fault indicators will be installed on segments of overhead and underground in the Maryville Centre business park to improve outage analysis and restoration. This work will be performed on WR 21MT644355. This circuit was cycle trimmed in July 2015.



## 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:** 1023  
**Customer Interruptions (CI):** 2602  
**SAIFI Value:** 2.54  
**SAIDI Value:** 103

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	2	< 0.01%	2
EQUIPMENT/OH	58	2.23%	5
EQUIPMENT/UG	189	7.26%	12
OTHER	61	2.34%	1
PREARRANGED	228	8.76%	11
PUBLIC	1031	39.62%	3
TREES	1031	39.62%	4
UNKNOWN	2	< 0.01%	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

This circuit splits in two major pieces at Kehrs Mill Rd and the transmission right-of-way. Fault indicators will be installed on this circuit to aid in restoration. This work will be performed on WR 21MT644360. Cycle tree trimming is planned for 2016.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 282053  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63005, 63017  
**Customers Served:** 1949  
**Customer Interruptions (CI):** 4171  
**SAIFI Value:** 2.14  
**SAIDI Value:** 178

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	1	< 0.01%	1
CUSTOMER	23	< 0.01%	1
EQUIPMENT/OH	19	< 0.01%	2
EQUIPMENT/UG	19	< 0.01%	6
OTHER	41	< 0.01%	3
PREARRANGED	46	1.10%	4
PUBLIC	4022	96.43%	16

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 vast majority of CI were due to public vehicle incidents. The poles on Baxter Road are near the road due to right-of-way constraints. An additional isolation switch and additional faulted circuit indicators will be installed to aid restoration. The work will be performed on WR 21MT644362. Cycle tree trimming is planned for 2016. An underground visual inspection is planned for 2016.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 282058  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63005, 63011, 63017  
**Customers Served:** 1260  
**Customer Interruptions (CI):** 3051  
**SAIFI Value:** 2.42  
**SAIDI Value:** 114

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	25	< 0.01%	4
EQUIPMENT/OH	1223	40.09%	3
EQUIPMENT/UG	104	3.41%	14
PREARRANGED	278	9.11%	11
PUBLIC	1278	41.89%	2
TREES	118	3.87%	5
UNKNOWN	25	< 0.01%	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

The circuit will have additional fault indicators installed on it to aid in outage analysis and restoration since significant parts of the circuit are on the transmission right-of-way or private property. This work will be performed on WR 21MT644452. Cycle tree trimming is planned for 2016.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 294057  
**Division:** UNDERGROUND  
**ZIP Codes(s) Served:** 63101, 63102, 63103  
**Customers Served:** 12  
**Customer Interruptions (CI):** 29  
**SAIFI Value:** Y2013 - 0.92; Y2014 - 1.58; Y2015 - 2.42  
**SAIDI Value:** 300

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/UG	11	7	28	96.55%	8
PUBLIC	0	0	1	3.45%	1
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

In order to prevent future flooding in the Metrolink Customer Indoor Room the following improvements were made: Customer installed a drain loop in the routing of the cable into the customer switch gear to prevent water from traveling along the cable jacket and into the switchgear. Customer installed aluminum drain pan below conduit wall penetration and feeder drain loop and ensured that drain pan has two (2) separate drain locations. Customer installed aluminum drip shield below wall penetration to direct water into drain pan. Customer installed two (2) separate drains in the top hat, below the new drain pan. Ameren replaced the feeder cables from the manhole to the indoor Metrolink room.

#### Corrective Actions Planned

As part of a project to add primary service to 812 Olive Street (Arcade Building) sectionalizing Vista switchgear will be installed. The new equipment will provide sectionalizing capability for the feeder which will improve restoration time on the entire circuit. This project (J06CW) is scheduled for construction to be completed in May 2016. Additionally 0A321 Revitalization efforts will be focused on installing new conduit and EPR cable in the locations where stream lines have historically increased the probability of circuit failures. J08CX will install new conduit along Locust St between Tucker & 11th St. The new conduit will be routed away from steam lines and insulated when necessary. This project will be designed in 2016 and construction completed in June 2017. J000B will install new conduit along Olive St between Tucker & 9th St. The new conduit will be routed away from steam lines and insulated when necessary. This project will be designed in 2016 and construction completed in October 2017. 0A321-GRAT-Broad Pine-Olive Cond will install new conduit along Pine between 6th St & 3rd St & Broadway St between Pine & Olive. The new conduit will be routed away from steam lines and insulated when necessary. The project will be designed in 2017 and construction completed in June 2018. 0A321-GRAT-3rd Spruce-Pine Cond will install new conduit along 3rd St between Spruce





## **APPENDIX B**

& Pine. The new conduit will be routed away from steam lines and insulated when necessary. The project will be designed in 2017 and construction completed in June 2018.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 295056  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63005, 63017, 63038  
**Customers Served:** 582  
**Customer Interruptions (CI):** 1235  
**SAIFI Value:** 2.12  
**SAIDI Value:** 142

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	11	< 0.01%	3
EQUIPMENT/OH	219	17.73%	17
EQUIPMENT/UG	20	1.62%	1
PREARRANGED	34	2.75%	21
PUBLIC	461	37.33%	2
TREES	490	39.68%	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

Most outages occurred beyond a recloser on Rieger Rd near Babler Park Drive. There are few sectionalizing switches in the circuit. Several sectionalizing switches and fault indicators will be installed to aid with outage analysis and restoration. This work will be performed on WR 21MT644454. Cycle tree trimming is planned for 2016.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 317001  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63111, 63137, 63147  
**Customers Served:** 758  
**Customer Interruptions (CI):** 1555  
**SAIFI Value:** 2.05  
**SAIDI Value:** 61

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	765	49.20%	3
EQUIPMENT/UG	755	48.55%	2
OTHER	2	< 0.01%	1
TREES	11	< 0.01%	2
UNKNOWN	22	1.41%	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

Overhead primary failed on July 27 and repaired on WR 21MT628571. A 50 KVA transformer failed on May 26 and replaced on WR 21MT624625. A wire connection was broken on Nov. 23 and repaired under an OAS order. On August 18 an underground primary cable failed and was repaired on WR 21MT629915. No further action required.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 317010  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63107, 63137, 63147  
**Customers Served:** 469  
**Customer Interruptions (CI):** 1562  
**SAIFI Value:** 3.33  
**SAIDI Value:** 101

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
CUSTOMER	2	< 0.01%	1
EQUIPMENT/OH	350	22.41%	9
EQUIPMENT/UG	11	< 0.01%	1
LIGHTNING	138	8.83%	1
PREARRANGED	104	6.66%	9
PUBLIC	944	60.44%	4
UNKNOWN	13	< 0.01%	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

On Aug. 28 a truck hit an overhead conductor which pulled a pole down. Repairs and pole replacement was performed under WR 21MT630684. On Sept. 2 a truck hit a pole which was replaced on WR 21MT631109. There were some isolated overhead equipment issues as follows: a tree limb broke a secondary span and was repaired on WR 21MT636706; a primary conductor made contact with neutral and was repaired under an OAS order; a transformer tripped and was reset and held, and a transformer failed and was replaced on WR 21MT616495. No further action is required.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 389052  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63346, 63385  
**Customers Served:** 1505  
**Customer Interruptions (CI):** 3364  
**SAIFI Value:** 2.24  
**SAIDI Value:** 50

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	30	< 0.01%	4
EQUIPMENT/OH	1380	41.02%	4
LIGHTNING	1625	48.31%	3
PREARRANGED	164	4.88%	6
PUBLIC	16	< 0.01%	2
TREES	91	2.71%	2
UNKNOWN	58	1.72%	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

WRs 2WWZ171971, 2WWZ171984, and 2WWZ171988 have been created to add fused switches to 18 transformers and 3 taps connected to the backbone.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 451054  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63622, 63623, 63625, 63650,,  
**Customers Served:** 322  
**Customer Interruptions (CI):** 950  
**SAIFI Value:** Y2013 - 3.15; Y2014 - 1.14; Y2015 - 2.95  
**SAIDI Value:** 620

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	0	1	13	1.37%	4
CUSTOMER	0	0	1	< 0.01%	1
EQUIPMENT/OH	576	337	567	59.68%	26
LIGHTNING	9	1	39	4.11%	7
OTHER	0	0	2	< 0.01%	2
PREARRANGED	0	7	291	30.63%	8
PUBLIC	19	0	0	0.00%	0
TREES	237	36	36	3.79%	6
UNKNOWN	390	2	1	< 0.01%	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

In 2012 automated switches were installed on 2 large single-phase taps to create a tie to isolate and remotely restore some customers during outage conditions in the area. In 2013 the circuit was ground-line and visually inspected with the resulting work completed in 2014. The regular cycle tree trim was also completed in 2014, as well as URD visual and detailed inspections. In 2015 there were 3 new automated switches installed on the circuits 3 phase backbone to isolate and automatically transfer load during outage conditions. Also in 2015, a five mile single-phase circuit was reconductored and one mile new circuit tie was built to establish a tie point for a group of customers on this circuit who have experienced 4 or more outages. Additional reclosers, fuses, and switches were also installed on two work requests in 2015.

#### Corrective Actions Planned

An engineering review of the circuit will be completed in 2016. A reliability project will be completed to address identified reliability and maintenance issues and install additional animal guards and switches as needed. This work will be completed under WR 28IR041016. Mid-cycle circuit patrol for tree issues will be completed in 2017.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 452053  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63830, 63851, 63877  
**Customers Served:** 286  
**Customer Interruptions (CI):** 637  
**SAIFI Value:** Y2013 - 1.17; Y2014 - 3.30; Y2015 - 2.23  
**SAIDI Value:** 240

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	0	4	4	< 0.01%	3
CUSTOMER	0	1	1	< 0.01%	1
EQUIPMENT/OH	23	370	542	85.09%	11
EQUIPMENT/UG	3	0	0	0.00%	0
LIGHTNING	2	12	3	< 0.01%	3
OTHER	0	1	1	< 0.01%	1
PREARRANGED	299	11	25	3.92%	7
PUBLIC	14	295	8	1.26%	1
TREES	1	241	4	< 0.01%	2
UNKNOWN	0	3	49	7.69%	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

Air spoilers were installed to prevent galloping on WRs 2TSE110190 and 2TSE110191 in 2015.

#### Corrective Actions Planned

Additional air spoilers will be installed to prevent galloping on WRs 2TSE113854 and 2TSE113855 in 2016.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 456055  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63827, 63840, 63851, 63857  
**Customers Served:** 92  
**Customer Interruptions (CI):** 641  
**SAIFI Value:** Y2013 - 0.09; Y2014 - 3.42; Y2015 - 6.97  
**SAIDI Value:** 185

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	0	1	1	< 0.01%	1
CUSTOMER	0	1	0	0.00%	0
EMPLOYEES	1	0	0	0.00%	0
EQUIPMENT/OH	7	221	606	94.54%	11
LIGHTNING	0	0	1	< 0.01%	1
OTHER	0	0	32	4.99%	1
PREARRANGED	0	93	0	0.00%	0
TREES	0	6	1	< 0.01%	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

Air spoilers were installed to prevent galloping and additional lightning protection was installed on WRs 2TSE110190 and 2TSE110191 in 2015.

#### Corrective Actions Planned

A Mid Cycle Patrol is planned for 2016.





## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 457055  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63837, 63847, 63852, 63862,  
**Customers Served:** 435  
**Customer Interruptions (CI):** 1060  
**SAIFI Value:** Y2013 - 0.03; Y2014 - 3.24; Y2015 - 2.44  
**SAIDI Value:** 211

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	2	1	8	< 0.01%	2
CUSTOMER	0	2	1	< 0.01%	1
EQUIPMENT/OH	6	963	71	6.70%	5
EQUIPMENT/UG	4	10	34	3.21%	7
LIGHTNING	1	447	441	41.60%	2
OTHER	0	1	3	< 0.01%	3
PREARRANGED	0	4	29	2.74%	9
PUBLIC	0	1	11	1.04%	1
TREES	1	2	16	1.51%	2
UNKNOWN	0	1	446	42.08%	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 Taken

34KV "Viper" reclosers were installed on both sides of the Gibson substation under WRs 2TSE106641 and 2TSE106642 in 2014, which will enable the Gibson substation to be served from either the Jim Hill or Portageville bulk substation. Air spoilers were installed on this circuit under WR 2TSE106444 in 2014.

#### Corrective Actions Planned

No further actions are planned.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 465051  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63877  
**Customers Served:** 520  
**Customer Interruptions (CI):** 1093  
**SAIFI Value:** 2.10  
**SAIDI Value:** 94

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	37	3.39%	3
EQUIPMENT/OH	566	51.78%	6
LIGHTNING	12	1.10%	1
PREARRANGED	2	< 0.01%	1
PUBLIC	10	< 0.01%	1
TREES	464	42.45%	2
UNKNOWN	2	< 0.01%	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

Air spoilers and wire spacers will be installed to prevent galloping on WRs 2TSE113803 and 2TSE113804 in 2016.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 465056  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63877  
**Customers Served:** 171  
**Customer Interruptions (CI):** 346  
**SAIFI Value:** 2.02  
**SAIDI Value:** 78

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	50	14.45%	2
EQUIPMENT/OH	62	17.92%	6
LIGHTNING	56	16.18%	2
TREES	176	50.87%	1
UNKNOWN	2	< 0.01%	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

Air spoilers and wire spacers will be installed to prevent galloping on WRs 2TSE113805 and 2TSE113806 in 2016. Improved coordination for sections of this circuit will be accomplished by installing additional reclosers to mitigate outages. This work will be performed under WR 2TSE113807 in 2016.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 477051  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63624, 63648  
**Customers Served:** 192  
**Customer Interruptions (CI):** 742  
**SAIFI Value:** Y2013 - 2.40; Y2014 - 0.18; Y2015 - 3.86  
**SAIDI Value:** 202

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	0	8	1	< 0.01%	1
CUSTOMER	0	0	1	< 0.01%	1
EQUIPMENT/OH	197	2	586	78.98%	8
EQUIPMENT/UG	6	0	4	< 0.01%	2
LIGHTNING	0	0	46	6.20%	3
OTHER	0	3	0	0.00%	0
PREARRANGED	0	3	22	2.96%	6
PUBLIC	0	17	81	10.92%	2
TREES	62	0	0	0.00%	0
UNKNOWN	189	0	1	< 0.01%	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

In 2013, two miles of this 3-phase circuit were reconductored. In 2014, additional fuses and switches were installed to further isolate outages. Phase balancing was also conducted on this circuit in 2014.

#### Corrective Actions Planned

An engineering review of the circuit will be completed in 2016. A reliability project will be completed to address reliability and maintenance issues identified and install additional animal guards and switches as needed. This work will be completed under WR 28IR041017.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 488052  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63080, 63664  
**Customers Served:** 438  
**Customer Interruptions (CI):** 876  
**SAIFI Value:** 2.00  
**SAIDI Value:** 131

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	606	69.18%	18
LIGHTNING	1	< 0.01%	1
OTHER	202	23.06%	3
PREARRANGED	1	< 0.01%	1
PUBLIC	36	4.11%	2
TREES	17	1.94%	7
UNKNOWN	13	1.48%	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 circuit is scheduled for Cycle Trim in 2016. An engineering review of the circuit will be completed in 2016. A reliability project will be completed to address identified reliability and maintenance issues. This work will be completed under WR 28IR041018.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 506055  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63090  
**Customers Served:** 526  
**Customer Interruptions (CI):** 1128  
**SAIFI Value:** 2.14  
**SAIDI Value:** 355

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	13	1.15%	2
EQUIPMENT/OH	1093	96.90%	1
EQUIPMENT/UG	14	1.24%	2
OTHER	1	< 0.01%	1
PREARRANGED	7	< 0.01%	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

A total circuit outage occurred when a switch connection failed. At the time of this failure, an abnormal switching condition existed so customers on two circuits were interrupted. The switch and connections were replaced on WR 23FR057736. No further actions planned.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 506056  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63090  
**Customers Served:** 899  
**Customer Interruptions (CI):** 1859  
**SAIFI Value:** 2.07  
**SAIDI Value:** 164

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	3	< 0.01%	3
EQUIPMENT/OH	49	2.64%	2
PREARRANGED	6	< 0.01%	1
PUBLIC	909	48.90%	5
TREES	892	47.98%	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

One total circuit outage occurred due to public vehicle damage and one total circuit outage occurred due to tree contact. The circuit is scheduled for trimming on cycle in 2016. No further actions planned.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 544055  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63301, 63303  
**Customers Served:** 854  
**Customer Interruptions (CI):** 2034  
**SAIFI Value:** 2.38  
**SAIDI Value:** 56

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EMPLOYEES	36	1.77%	1
EQUIPMENT/OH	157	7.72%	2
EQUIPMENT/UG	1750	86.04%	9
OTHER	4	< 0.01%	2
PREARRANGED	60	2.95%	8
PUBLIC	1	< 0.01%	1
TREES	26	1.28%	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 underground cable splice failed in a manhole located along Cambrian Way which resulted in a circuit outage. This circuit outage caused the majority of customer interruptions in 2015. The underground cable splice that failed was repaired under WR 25SC060726. The other customer interruptions due to equipment malfunctions and tree contacts will be inspected to determine if any further correction action is needed.





## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 546051  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63016, 63049, 63051  
**Customers Served:** 583  
**Customer Interruptions (CI):** 1402  
**SAIFI Value:** Y2013 - 1.51; Y2014 - 0.25; Y2015 - 2.40  
**SAIDI Value:** 301

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	0	0	16	1.14%	2
CUSTOMER	1	0	1	< 0.01%	1
EQUIPMENT/OH	153	28	1177	83.95%	8
EQUIPMENT/UG	0	30	0	0.00%	0
LIGHTNING	1	0	0	0.00%	0
OTHER	41	15	1	< 0.01%	1
OVERLOAD	1	0	0	0.00%	0
PREARRANGED	0	32	8	< 0.01%	3
PUBLIC	0	0	195	13.91%	3
TREES	654	36	2	< 0.01%	2
UNKNOWN	11	0	2	< 0.01%	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 Taken

Tree trimming was performed on this circuit in 2014.

#### Corrective Actions Planned

A single circuit outage event on September 19, 2015 resulted in 84% of the total years customer interruptions. This outage was caused by the failure of a single-phase transformer tapped onto the circuit backbone. The circuit was initially patrolled with no obvious cause found. The breaker was closed and remained closed for a short period of time before it locked out again. At this point the failed single-phase transformer was found and repaired. No corrective actions are planned at this time.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 551053  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63020  
**Customers Served:** 1101  
**Customer Interruptions (CI):** 2507  
**SAIFI Value:** 2.28  
**SAIDI Value:** 35

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	37	1.48%	5
EQUIPMENT/OH	9	< 0.01%	7
EQUIPMENT/UG	1	< 0.01%	1
OTHER	34	1.36%	5
PREARRANGED	165	6.58%	11
PUBLIC	2199	87.71%	4
TREES	4	< 0.01%	1
UNKNOWN	58	2.31%	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

The circuit experienced two circuit outages in 2015 due to the same event. On May 1 a vehicle struck and broke a pole on the circuit backbone. The second circuit outage associated with this circuit was to allow crews to safely complete the repair and was only 16 minutes in duration. This incident was responsible for 87% of the circuit's 2015 customer interruptions. WR 26JF133101 was created to install squirrel guards to reduce outages to four customers to address a multiple device interruption on fuse 6971. This project is expected to be completed in 2016. No other actions are planned at this time.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 559051  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63020, 63028  
**Customers Served:** 668  
**Customer Interruptions (CI):** 1327  
**SAIFI Value:** Y2013 - 0.06; Y2014 - 2.80; Y2015 - 1.99  
**SAIDI Value:** 573

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	1	0	13	< 0.01%	3
CUSTOMER	1	0	4	< 0.01%	4
EQUIPMENT/OH	2	188	177	13.34%	8
EQUIPMENT/UG	1	1	0	0.00%	0
LIGHTNING	0	1	5	< 0.01%	3
OTHER	0	1	0	0.00%	0
PREARRANGED	1	740	23	1.73%	9
PUBLIC	0	102	994	74.91%	6
TREES	34	620	95	7.16%	9
UNKNOWN	0	215	16	1.21%	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

The groundwire that caused two circuit outages in 2014 was repaired on WR 26JF127420 on 10/08/2015.

#### Corrective Actions Planned

This circuit experienced two events in 2015 that resulted in 75% of the customer interruptions. On September 8 and November 20, vehicles struck poles and caused circuit outages. Another major outage occurred when a voltage regulator (8367) failed and had to be disconnected from the primary. This resulted in 103 customer interruptions. There is an existing set of 280 amp circuit reclosers placed in the backbone to limit the exposure for a total circuit outage. No additional circuit improvements are planned at this time.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 560053  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63026, 63049  
**Customers Served:** 1415  
**Customer Interruptions (CI):** 3899  
**SAIFI Value:** 2.76  
**SAIDI Value:** 101

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	29	< 0.01%	7
CUSTOMER	2	< 0.01%	2
EQUIPMENT/OH	330	8.46%	11
EQUIPMENT/UG	1	< 0.01%	1
PREARRANGED	283	7.26%	47
PUBLIC	1488	38.16%	6
TREES	1660	42.58%	12
UNKNOWN	106	2.72%	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 circuit outages on this circuit accounted for 73% of the 2015 customer interruptions. One circuit outage on September 17, 2015 was the result of a car accident. The other two circuit outages occurred on August 23, 2015 and were the result of a very large tree falling onto the backbone. Two outages were incurred at this time to allow the crew to safely repair the circuit while attempting to restore as many customers as possible. In analyzing the circuit, it was determined that with the addition of a new set of 600 amp switches at Deloris Drive and Highway 30 would have allowed for the partial restoration of electric service to an additional 835 customers. This set of switches will be installed under WR 26JF134901. The tree that caused the outage was located along a hillside parallel to the circuit. Substantial trimming of these private property trees are not possible since they provide a barrier between homes and Highway 30.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 565054  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63301, 63304, 63373  
**Customers Served:** 515  
**Customer Interruptions (CI):** 1899  
**SAIFI Value:** 3.69  
**SAIDI Value:** 176

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	2	< 0.01%	2
CUSTOMER	1	< 0.01%	1
EMPLOYEES	1	< 0.01%	1
EQUIPMENT/OH	808	42.55%	11
EQUIPMENT/UG	11	< 0.01%	4
LIGHTNING	54	2.84%	5
OTHER	4	< 0.01%	2
PREARRANGED	200	10.53%	11
PUBLIC	818	43.08%	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

This circuit is scheduled for maintenance tree trimming in 2016. The repair work identified as a result of the 2016 underground visual inspection will be completed in accordance with Ameren Missouri's infrastructure inspection policy. Division engineering will perform a circuit patrol in early 2016 and review the device outages due to equipment malfunctions and tree contacts to determine if any additional action is needed.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 566051  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63301, 63373, 63386  
**Customers Served:** 514  
**Customer Interruptions (CI):** 1477  
**SAIFI Value:** Y2013 - 1.17; Y2014 - 2.46; Y2015 - 2.87  
**SAIDI Value:** 371

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	29	1	5	< 0.01%	2
CUSTOMER	1	0	1062	71.90%	4
EMPLOYEES	0	0	13	< 0.01%	2
EQUIPMENT/OH	9	571	298	20.18%	8
LIGHTNING	0	49	0	0.00%	0
OTHER	1	0	0	0.00%	0
OVERLOAD	0	1	0	0.00%	0
PREARRANGED	0	0	84	5.69%	48
PUBLIC	0	289	0	0.00%	0
TREES	602	384	4	< 0.01%	4
UNKNOWN	5	49	11	< 0.01%	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 Taken

The repair work identified as a result of the 2014 groundline inspection was completed in accordance with Ameren Missouri's infrastructure inspection policy in 2015. Overhead solid blade switches were installed on the circuit backbone at the end of 2015 on WR 25SC060717 to help further isolate and minimize outages and to enhance circuit switching capabilities.

#### Corrective Actions Planned

Maintenance tree trimming on this circuit is scheduled to be completed in 2016. Division engineering will perform a circuit patrol in early 2016 and review the device outages due to equipment malfunctions and tree contacts to determine if any additional action is needed.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 616004  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63353  
**Customers Served:** 239  
**Customer Interruptions (CI):** 510  
**SAIFI Value:** 2.13  
**SAIDI Value:** 49

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	17	3.33%	1
PREARRANGED	37	7.25%	6
TREES	228	44.71%	1
UNKNOWN	228	44.71%	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

This circuit exits the substation and splits in two directions, southeast and northwest. WR 2WWZ172224 has been created to add three fuse switches on the portion of the circuit that goes southeast.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 616008  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63353  
**Customers Served:** 196  
**Customer Interruptions (CI):** 433  
**SAIFI Value:** 2.21  
**SAIDI Value:** 313

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
CUSTOMER	14	3.23%	1
EQUIPMENT/OH	224	51.73%	3
OTHER	192	44.34%	1
PREARRANGED	2	< 0.01%	1
TREES	1	< 0.01%	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

WRs 2WWZ172225 and 2WWZ172226 have been created to add fused switches to 10 transformers and 2 taps connected to the backbone.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 629051  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63330, 63334, 63336, 63353  
**Customers Served:** 484  
**Customer Interruptions (CI):** 1284  
**SAIFI Value:** 2.65  
**SAIDI Value:** 117

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	689	53.66%	9
LIGHTNING	39	3.04%	1
PREARRANGED	38	2.96%	7
TREES	34	2.65%	1
UNKNOWN	484	37.69%	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

WRs 2WWZ167444, 2WWZ172232, 2WWZ172264, and 2WWZ172305, have been created to add fused switches to 17 transformers and to add two sets of three 300 amp switches in the overhead circuit.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 635001  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63701  
**Customers Served:** 763  
**Customer Interruptions (CI):** 1600  
**SAIFI Value:** 2.10  
**SAIDI Value:** 150

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	783	48.94%	5
PREARRANGED	53	3.31%	9
TREES	764	47.75%	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

Additional fuses and reclosers will be installed on this circuit to isolate outages. This work will be done on WR 2TSE113858 in 2016.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 645051  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63301, 63303, 63304, 63366,  
**Customers Served:** 328  
**Customer Interruptions (CI):** 667  
**SAIFI Value:** 2.03  
**SAIDI Value:** 54

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	2	< 0.01%	1
PREARRANGED	12	1.80%	1
PUBLIC	652	97.75%	3
TREES	1	< 0.01%	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

An engineering review of the circuit, including a visual field inspection will be completed in 2016. WR 2WWZ172412 has been created to install fused switches on taps along this circuit to reduce circuit outages.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 646052  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63701  
**Customers Served:** 955  
**Customer Interruptions (CI):** 2368  
**SAIFI Value:** 2.48  
**SAIDI Value:** 102

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	33	1.39%	2
EQUIPMENT/OH	217	9.16%	26
LIGHTNING	104	4.39%	3
PREARRANGED	15	< 0.01%	7
PUBLIC	15	< 0.01%	3
TREES	1753	74.03%	23
UNKNOWN	231	9.76%	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

Additional fuses, reclosers and switches will be installed on this circuit to isolate outages. This work will be done on WR 2TSE113851 in 2016.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 646055  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63701, 63703  
**Customers Served:** 1323  
**Customer Interruptions (CI):** 4206  
**SAIFI Value:** 3.18  
**SAIDI Value:** 74

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	19	< 0.01%	3
EQUIPMENT/OH	740	17.59%	12
EQUIPMENT/UG	7	< 0.01%	1
PREARRANGED	16	< 0.01%	4
TREES	3424	81.41%	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

Additional fuses, reclosers and switches will be installed on this circuit to isolate outages. This work will be done on WR 2TSE113850 in 2016.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 652053  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63390  
**Customers Served:** 597  
**Customer Interruptions (CI):** 1979  
**SAIFI Value:** 3.31  
**SAIDI Value:** 74

#### **Outage Analysis**

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	23	1.16%	1
CUSTOMER	1	< 0.01%	1
EQUIPMENT/OH	1	< 0.01%	1
OTHER	1205	60.89%	9
PREARRANGED	715	36.13%	25
PUBLIC	34	1.72%	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**

This circuit goes in multiple directions. WR 2WWZ172100 has been created to install a set of reclosers on one of the three-phase taps off the backbone. In addition, a fused switch will be added for one transformer and for one tap connected to the backbone.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 652055  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63383, 63390  
**Customers Served:** 992  
**Customer Interruptions (CI):** 2376  
**SAIFI Value:** 2.40  
**SAIDI Value:** 108

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	3	< 0.01%	3
CUSTOMER	2	< 0.01%	1
EQUIPMENT/OH	31	1.30%	5
EQUIPMENT/UG	2	< 0.01%	2
LIGHTNING	26	1.09%	3
PREARRANGED	102	4.29%	14
PUBLIC	186	7.83%	3
TREES	2021	85.06%	6
UNKNOWN	3	< 0.01%	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 experienced two circuit interruptions in 2015 as a result trees falling onto the backbone of the circuit. One instance was during a thunderstorm and the second was from a tree outside the right-of-way/easement. Due to the length and exposure of this circuit, WR 2WWZ172140 has been created to transfer the north portion of the circuit to a different circuit. In addition, WR 2WWZ172093 has been created to add fuse switches for 5 transformers and 2 taps on the backbone.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 656055  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63822, 63841  
**Customers Served:** 1010  
**Customer Interruptions (CI):** 2102  
**SAIFI Value:** 2.08  
**SAIDI Value:** 141

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	37	1.76%	5
CUSTOMER	2	< 0.01%	2
EQUIPMENT/OH	1393	66.27%	11
EQUIPMENT/UG	57	2.71%	8
LIGHTNING	55	2.62%	3
PREARRANGED	10	< 0.01%	7
PUBLIC	539	25.64%	4
TREES	9	< 0.01%	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

Improved coordination for sections of this circuit will be accomplished by installing additional reclosers to mitigate outages. This work will be performed under WR 2TSE113856 in 2016.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 665053  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63379  
**Customers Served:** 343  
**Customer Interruptions (CI):** 871  
**SAIFI Value:** 2.54  
**SAIDI Value:** 44

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	849	97.47%	6
PREARRANGED	17	1.95%	6
TREES	1	< 0.01%	1
UNKNOWN	4	< 0.01%	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

WRs 2WWZ172034 and 2WWZ172044 have been created to add fuse switch to 6 transformers and to one tap connected to the backbone.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 673053  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63362, 63379  
**Customers Served:** 639  
**Customer Interruptions (CI):** 1266  
**SAIFI Value:** Y2013 - 1.62; Y2014 - 0.08; Y2015 - 1.98  
**SAIDI Value:** 187

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	2	20	0	0.00%	0
CUSTOMER	0	0	1	< 0.01%	1
EQUIPMENT/OH	356	3	614	48.50%	4
LIGHTNING	3	11	630	49.76%	4
PREARRANGED	3	0	20	1.58%	4
PUBLIC	572	0	0	0.00%	0
UNKNOWN	5	12	1	< 0.01%	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

WR 2WWZ161051, completed in August 2015, reconductored 0.45 mile of 1-phase 7.2kV circuit with 1/0AAAC primary and neutral along Hampel Road. This job eliminated 0.2 mile of cross-country circuit. In addition, 5 poles and miscellaneous circuit repairs were completed in 2013 as a result of the overhead visual inspection in 2012.

#### Corrective Actions Planned

WRs 2WWZ172008 and 2WWZ172013 have been created to add fused switches to 10 transformers and to 3 taps connected to the backbone. In addition, 3 sets of lightning arresters will be installed to the circuit.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 685053  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63801, 63867, 63868  
**Customers Served:** 504  
**Customer Interruptions (CI):** 2441  
**SAIFI Value:** Y2013 - 0.27; Y2014 - 1.96; Y2015 - 4.84  
**SAIDI Value:** 126

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	46	1	33	1.35%	3
CUSTOMER	1	1	1	< 0.01%	1
EQUIPMENT/OH	25	265	651	26.67%	11
EQUIPMENT/UG	1	53	2	< 0.01%	2
LIGHTNING	42	2	49	2.01%	2
OTHER	20	5	2	< 0.01%	2
OVERLOAD	0	20	0	0.00%	0
PREARRANGED	0	0	67	2.74%	20
PUBLIC	0	559	8	< 0.01%	3
TREES	1	88	519	21.26%	1
UNKNOWN	1	4	1109	45.43%	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

Improved coordination for sections of this circuit was accomplished by installing additional reclosers to mitigate outages. This work was completed under WR 2TSE108393 in 2015.

#### Corrective Actions Planned

Air spoilers will be installed to prevent galloping and additional lightning protection will be installed on WRs 2TSE1138848 and 2TSE113849 in 2016.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 690057  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63841, 63846, 63873  
**Customers Served:** 611  
**Customer Interruptions (CI):** 1677  
**SAIFI Value:** 2.74  
**SAIDI Value:** 103

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	11	< 0.01%	2
EQUIPMENT/OH	1189	70.90%	14
EQUIPMENT/UG	4	< 0.01%	2
LIGHTNING	7	< 0.01%	4
OTHER	416	24.81%	3
OVERLOAD	6	< 0.01%	1
PREARRANGED	41	2.44%	6
PUBLIC	1	< 0.01%	1
UNKNOWN	2	< 0.01%	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

Air spoilers will be installed on the 12kV circuit to prevent galloping and additional lightning arresters will be installed under WR 2TSE113853 in 2016.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 698003  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63823  
**Customers Served:** 302  
**Customer Interruptions (CI):** 1033  
**SAIFI Value:** 3.42  
**SAIDI Value:** 97

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	942	91.19%	6
OTHER	1	< 0.01%	1
PREARRANGED	87	8.42%	5
TREES	2	< 0.01%	1
UNKNOWN	1	< 0.01%	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

Additional fuses, reclosers and switches were installed on this circuit to isolate outages. This work was completed on WR 2TSE111514 in 2015. No further action is required.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 698007  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63823  
**Customers Served:** 117  
**Customer Interruptions (CI):** 250  
**SAIFI Value:** 2.14  
**SAIDI Value:** 89

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	125	50.00%	3
OTHER	2	< 0.01%	2
UNKNOWN	123	49.20%	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

Additional fuses, reclosers and switches were installed on this circuit to isolate outages. This work was done on WR 2TSE111515 in 2015. No further actions are planned.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 717051  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 64024  
**Customers Served:** 1130  
**Customer Interruptions (CI):** 3455  
**SAIFI Value:** 3.06  
**SAIDI Value:** 72

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	10	< 0.01%	4
CUSTOMER	6	< 0.01%	1
EQUIPMENT/OH	2273	65.79%	18
LIGHTNING	1	< 0.01%	1
PREARRANGED	21	< 0.01%	7
PUBLIC	1139	32.97%	4
TREES	3	< 0.01%	3
UNKNOWN	2	< 0.01%	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

Most of the events were caused by substation equipment issues including equipment failure and public vehicles. Division personnel will review the circuit condition, design issues and repetitive causes prior to June 1, 2016 and all corrective action work will be performed on WR 2HGH048712.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 718051  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 64024, 64060, 64068, 64073  
**Customers Served:** 158  
**Customer Interruptions (CI):** 518  
**SAIFI Value:** 3.28  
**SAIDI Value:** 68

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	325	62.74%	7
LIGHTNING	12	2.32%	2
PREARRANGED	20	3.86%	2
TREES	1	< 0.01%	1
UNKNOWN	160	30.89%	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

Division personnel will review the circuit condition, design issues and repetitive causes prior to June 1, 2016 and all corrective action work will be performed on WR 2HGH048710.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 718053  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 64024, 64068, 64073  
**Customers Served:** 666  
**Customer Interruptions (CI):** 1518  
**SAIFI Value:** 2.28  
**SAIDI Value:** 94

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	141	9.29%	6
CUSTOMER	2	< 0.01%	2
EQUIPMENT/OH	536	35.31%	9
EQUIPMENT/UG	22	1.45%	4
LIGHTNING	1	< 0.01%	1
PREARRANGED	40	2.64%	12
PUBLIC	3	< 0.01%	1
TREES	773	50.92%	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

Division personnel will review the circuit condition, tree conditions, design issues and repetitive causes prior to June 1, 2016 and all corrective action work will be performed on WR 2HGH048711.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 731051  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63353, 63433, 63441, 63459  
**Customers Served:** 322  
**Customer Interruptions (CI):** 791  
**SAIFI Value:** 2.46  
**SAIDI Value:** 102

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	2	< 0.01%	2
EQUIPMENT/OH	603	76.23%	17
LIGHTNING	11	1.39%	3
PREARRANGED	126	15.93%	8
TREES	49	6.19%	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

In 2015, WR 2WWZ162435 was completed that re-built approximately 6 miles of single-phase circuit as a three-phase circuit as part of a three-phase circuit extension to a customer. In addition, a set of reclosers were added to an existing three-phase section of the circuit. For 2016 WRs 2WWZ172290 and 2WWZ172308 have been created to add fused switches to 6 transformers and 1 tap connected to the backbone, add a set of 3 lightning arresters, and repair v-braces at 3 locations.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 753053  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63446, 63447, 63458, 63537  
**Customers Served:** 81  
**Customer Interruptions (CI):** 253  
**SAIFI Value:** 3.12  
**SAIDI Value:** 239

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
CUSTOMER	3	1.19%	3
EQUIPMENT/OH	38	15.02%	8
LIGHTNING	1	< 0.01%	1
PREARRANGED	2	< 0.01%	2
TREES	128	50.59%	2
UNKNOWN	81	32.02%	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

An engineering review of the circuit, including a visual field inspection, will be completed in 2016. WR 2HGH048714 has been created to install fused switches on taps along this circuit to reduce outages to Recloser 2237 at the LaBelle Substation.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 760051  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 64624, 64638, 64656, 64664,  
**Customers Served:** 400  
**Customer Interruptions (CI):** 1535  
**SAIFI Value:** 3.84  
**SAIDI Value:** 106

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	4	< 0.01%	4
EQUIPMENT/OH	1458	94.98%	4
LIGHTNING	58	3.78%	2
OTHER	1	< 0.01%	1
UNKNOWN	14	< 0.01%	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

Most of the events were caused by substation equipment issues. Division personnel will review the circuit condition, design issues and repetitive causes prior to June 1, 2016 and all corrective action work will be performed on WR 2HGH048709.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 780001  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 64060  
**Customers Served:** 235  
**Customer Interruptions (CI):** 487  
**SAIFI Value:** 2.07  
**SAIDI Value:** 138

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
CUSTOMER	1	< 0.01%	1
EQUIPMENT/OH	1	< 0.01%	1
EQUIPMENT/UG	7	1.44%	1
OTHER	236	48.46%	1
PREARRANGED	1	< 0.01%	1
PUBLIC	241	49.49%	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

Division personnel will review the circuit condition, tree conditions, design issues and repetitive causes prior to June 1, 2016 and all corrective action work will be performed on WR 2HGH048713.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 828056  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63784, 63801, 63824  
**Customers Served:** 310  
**Customer Interruptions (CI):** 912  
**SAIFI Value:** 2.94  
**SAIDI Value:** 139

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	1	< 0.01%	1
EQUIPMENT/OH	19	2.08%	8
LIGHTNING	325	35.64%	2
PREARRANGED	19	2.08%	2
PUBLIC	312	34.21%	2
TREES	236	25.88%	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

Air spoilers will be installed on the 12kV circuit to prevent galloping and additional lightning arresters will be installed under WR 2TSE113852 in 2016.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 851051  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63544, 63559  
**Customers Served:** 125  
**Customer Interruptions (CI):** 382  
**SAIFI Value:** 3.06  
**SAIDI Value:** 123

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	1	< 0.01%	1
CUSTOMER	2	< 0.01%	2
EQUIPMENT/OH	352	92.15%	11
EQUIPMENT/UG	1	< 0.01%	1
LIGHTNING	1	< 0.01%	1
OTHER	1	< 0.01%	1
PREARRANGED	3	< 0.01%	1
TREES	21	5.50%	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 engineering review of the circuit, including a visual field inspection, will be completed in 2016. WR 2HGH048734 has been created to install fused switches on taps along this circuit to reduce circuit outages. The next cycle tree trim is scheduled for 2017.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 852051  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63544, 63545  
**Customers Served:** 193  
**Customer Interruptions (CI):** 445  
**SAIFI Value:** 2.31  
**SAIDI Value:** 145

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	1	< 0.01%	1
EQUIPMENT/OH	226	50.79%	9
EQUIPMENT/UG	10	2.25%	1
LIGHTNING	15	3.37%	1
OTHER	1	< 0.01%	1
UNKNOWN	192	43.15%	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

An engineering review of the circuit, including a visual field inspection, will be completed in 2016. WR 2HGH048736 has been created to install fused switches on taps along this circuit to reduce circuit outages. The next overhead visual is scheduled for 2017. The next Cycle Trim is scheduled for 2017.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 852052  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63545  
**Customers Served:** 407  
**Customer Interruptions (CI):** 834  
**SAIFI Value:** 2.05  
**SAIDI Value:** 208

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	11	1.32%	4
EQUIPMENT/OH	411	49.28%	3
LIGHTNING	410	49.16%	1
PUBLIC	1	< 0.01%	1
TREES	1	< 0.01%	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

An engineering review of the circuit, including a visual field inspection, will be completed in 2016. WR 2HGH048738 has been created to install fused switches on taps along this circuit to reduce circuit outages. The next overhead visual and ground line inspection is scheduled for 2017.



## APPENDIX B

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 856052  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 63056, 63068, 63090  
**Customers Served:** 389  
**Customer Interruptions (CI):** 921  
**SAIFI Value:** Y2013 - 3.24; Y2014 - 0.65; Y2015 - 2.37  
**SAIDI Value:** 298

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	10	18	3	< 0.01%	3
EQUIPMENT/OH	852	164	428	46.47%	18
LIGHTNING	32	11	3	< 0.01%	3
OTHER	49	0	1	< 0.01%	1
OVERLOAD	0	0	1	< 0.01%	1
PREARRANGED	10	8	23	2.50%	10
PUBLIC	0	0	53	5.75%	1
TREES	301	8	403	43.76%	2
UNKNOWN	0	40	6	< 0.01%	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 Taken

An S&C "Intellirupter" automated switch was installed to provide better isolation of problems.

#### Corrective Actions Planned

During a wind storm tree limbs from some distance away were blown into the circuit causing circuit outage. The other circuit outage was taken to safely replace a crossarm that was found split when patrolling the line for the first circuit outage. No further actions planned.



## APPENDIX B

### Single 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:** 2.00  
**SAIDI Value:** 55

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
OTHER	2	100.0%	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 engineering review of the circuit, including a visual field inspection, will be completed in 2016. WR 2HGH048739 has been created to capture any reliability improvement work.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 878003  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63801  
**Customers Served:** 119  
**Customer Interruptions (CI):** 247  
**SAIFI Value:** 2.08  
**SAIDI Value:** 67

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/OH	5	2.02%	2
PREARRANGED	2	< 0.01%	1
PUBLIC	240	97.17%	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

Additional fuses, reclosers and switches will be installed on this circuit to isolate outages. This work will be done on WR 2TSE113857 in 2016.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 914059  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 65239, 65263, 65270  
**Customers Served:** 97  
**Customer Interruptions (CI):** 398  
**SAIFI Value:** 4.10  
**SAIDI Value:** 114

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	1	< 0.01%	1
EQUIPMENT/OH	304	76.38%	4
PREARRANGED	92	23.12%	2
TREES	1	< 0.01%	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

Division personnel will review the circuit condition, design issues and repetitive causes prior to June 1, 2016 and all corrective action work will be performed on WR 2DLD087825.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 940051  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63440  
**Customers Served:** 236  
**Customer Interruptions (CI):** 771  
**SAIFI Value:** 3.27  
**SAIDI Value:** 199

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	251	32.56%	4
CUSTOMER	34	4.41%	2
EQUIPMENT/OH	18	2.33%	5
OTHER	1	< 0.01%	1
PREARRANGED	269	34.89%	4
TREES	198	25.68%	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

An engineering review of the circuit, including a visual field inspection, will be completed in 2016. WR 2HGH048737 has been created to install fused switches on taps along this circuit to reduce circuit outages.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 951002  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63501  
**Customers Served:** 31  
**Customer Interruptions (CI):** 61  
**SAIFI Value:** 1.97  
**SAIDI Value:** 87

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
LIGHTNING	61	100.0%	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

An engineering review of the circuit, including a visual field inspection, will be completed in 2016. WR 2HGH048765 has been created to install fused switches on taps along this circuit to reduce circuit outages.



## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 977052  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 65001, 65035, 65582  
**Customers Served:** 418  
**Customer Interruptions (CI):** 872  
**SAIFI Value:** 2.09  
**SAIDI Value:** 283

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
CUSTOMER	1	< 0.01%	1
EQUIPMENT/OH	16	1.83%	6
PREARRANGED	2	< 0.01%	1
PUBLIC	422	48.39%	3
TREES	431	49.43%	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 circuit outage was due to a limb blown onto the circuit during a wind storm from a tree off the easement. Tree trimming would not have removed the limb. The second circuit outage was due to public vehicle accident on a backbone portion of the circuit and locking out the circuit. No further actions planned.





## APPENDIX B

### Single Year WPC Analysis and Remedial Action Report

**Circuit Number:** 986001  
**Division:** NORTHEAST MO  
**ZIP Codes(s) Served:** 63448  
**Customers Served:** 308  
**Customer Interruptions (CI):** 720  
**SAIFI Value:** 2.34  
**SAIDI Value:** 41

#### Outage Analysis

Causes	2015 Total CI	2015 % Total CI	2015 # Incidents
CUSTOMER	8	1.11%	4
EQUIPMENT/OH	23	3.19%	7
LIGHTNING	1	< 0.01%	1
OTHER	3	< 0.01%	3
OVERLOAD	6	< 0.01%	1
PREARRANGED	8	1.11%	2
PUBLIC	624	86.67%	2
TREES	5	< 0.01%	2
UNKNOWN	42	5.83%	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 engineering review of the circuit, including a visual field inspection, will be completed in 2016. WR 2HGH048735 has been created to install tap fuses along this circuit to reduce circuit outages. The next overhead visual is scheduled for 2017.



## APPENDIX C

DIVISION	OPERATING AREA	CIRCUIT	VOLT	CUSTOMERS	CI	CMI	SAIFI	SAIDI	2013	2014	2015	Years WPC
GATEWAY	BERKELEY	229052	12	1,781	2,215	711897	1.24	321	WPC	WPC		2
ARCHVIEW	GERALDINE	142006	4	268	327	203348	1.22	622	WPC	WPC		2
GATEWAY	BERKELEY	260051	12	2	2	5520	1.00	2760	WPC	WPC		2
GATEWAY	DORSETT	256057	12	195	44	103381	0.23	2350	WPC	WPC		2
CENTRAL MO	JEFFERSON CITY	719051	12	89	19	132668	0.21	6983	WPC	WPC		2
MERAMEC VALLEY	JEFFERSON	560052	12	2,012	244	447185	0.12	1833	WPC	WPC		2
SEMO	DEXTER	734053	12	49	3	24363	0.06	8121	WPC	WPC		2
CENTRAL MO	BOONEVILLE	873051	4	0	37	132364		3577	WPC	WPC		2



## APPENDIX D

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 142006  
**Division:** ARCHVIEW  
**ZIP Codes(s) Served:** 63110, 63139  
**Customers Served:** 267  
**Customer Interruptions (CI):** 335  
**SAIFI Value:** Y2013 - 1.52; Y2014 - 2.99; Y2015 - 1.25

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
CUSTOMER	0	0	2	< 0.01%	1
EQUIPMENT/OH	406	490	4	1.19%	3
EQUIPMENT/UG	0	269	270	80.60%	2
LIGHTNING	0	0	49	14.63%	4
OTHER	1	0	2	< 0.01%	2
PREARRANGED	0	0	8	2.39%	2
TREES	0	43	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

Terminations of UG cable at the 600A switch were fixed on WR 21MT639066

#### Corrective Actions Planned

No further actions planned at this time.



## APPENDIX D

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 229052  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63021, 63031, 63034, 63042  
**Customers Served:** 1783  
**Customer Interruptions (CI):** 2289  
**SAIFI Value:** Y2013 - 3.26; Y2014 - 1.70; Y2015 - 1.28

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	10	5	7	< 0.01%	5
EQUIPMENT/OH	193	47	49	2.14%	5
EQUIPMENT/UG	1865	1873	53	2.32%	3
LIGHTNING	1	1	0	0.00%	0
OTHER	1	1	111	4.85%	2
PREARRANGED	0	895	74	3.23%	26
PUBLIC	1737	1	0	0.00%	0
TREES	1795	131	178	7.78%	15
UNKNOWN	39	24	1817	79.38%	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

The circuit underwent overhead corrective action last year. Two distribution automation switches were installed on the circuit on the fourth quarter of 2015 under WRs 21MT620942 and 21MT620943.

#### Corrective Actions Planned

No further action planned at this time.



## APPENDIX D

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 256057  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63043, 63146  
**Customers Served:** 194  
**Customer Interruptions (CI):** 46  
**SAIFI Value:** Y2013 - 2.00; Y2014 - 3.31; Y2015 - 0.24

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	54	1	22	47.83%	4
CUSTOMER	0	0	2	4.35%	2
EMPLOYEES	0	157	0	0.00%	0
EQUIPMENT/OH	1	476	2	4.35%	2
EQUIPMENT/UG	456	3	2	4.35%	1
PREARRANGED	0	1	2	4.35%	1
PUBLIC	1	0	0	0.00%	0
UNKNOWN	1	0	16	34.78%	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

WR 21MT594950 was completed in 2014. This job replaced direct buried cable with new cable and conduit for better reliability. A new 45MVA transformer was installed and put in service February 2016.

#### Corrective Actions Planned

No future improvements planned at this time.



## APPENDIX D

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 260051  
**Division:** GATEWAY  
**ZIP Codes(s) Served:** 63034  
**Customers Served:** 2  
**Customer Interruptions (CI):** 2  
**SAIFI Value:** Y2013 - 1.59; Y2014 - 3.00; Y2015 - 1.00

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
EQUIPMENT/UG	27	5	2	100.0%	2
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

The division engineering performed several improvements on the circuits. Underground primary cable was repaired between manhole 3 and switch pad 5276, manhole 2 on west side of shopping complex under WRs 21MT578375 and 21MT603189. In the last quarter of 2015 fault indicators were added to the circuit under WRs 21MT620907 and 21MT620930.

#### Corrective Actions Planned

No future improvements planned at this time.



## APPENDIX D

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 560052  
**Division:** MERAMEC VALLEY  
**ZIP Codes(s) Served:** 63049, 63051  
**Customers Served:** 2008  
**Customer Interruptions (CI):** 534  
**SAIFI Value:** Y2013 - 2.04; Y2014 - 2.42; Y2015 - 0.27

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	1	4	36	6.74%	3
EMPLOYEES	0	1988	8	1.50%	1
EQUIPMENT/OH	2042	37	22	4.12%	2
EQUIPMENT/UG	1996	19	80	14.98%	5
PREARRANGED	6	0	244	45.69%	35
PUBLIC	3	803	16	3.00%	1
TREES	18	1999	92	17.23%	1
UNKNOWN	1	0	36	6.74%	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

A set of backbone reclosers J9918 was installed under WR 26JF130967 on May 15, 2015 to limit the exposure on the circuit at Schumacher Road. A mid-cycle tree trimming was completed in 2015.

#### Corrective Actions Planned

No planned improvements are scheduled at this time.



## APPENDIX D

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 719051  
**Division:** CENTRAL MO  
**ZIP Codes(s) Served:** 63363, 65041  
**Customers Served:** 89  
**Customer Interruptions (CI):** 31  
**SAIFI Value:** Y2013 - 3.06; Y2014 - 1.98; Y2015 - 0.35

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	0	1	2	6.45%	1
EQUIPMENT/OH	180	170	9	29.03%	2
PREARRANGED	0	7	12	38.71%	3
TREES	89	0	0	0.00%	0
UNKNOWN	0	0	8	25.81%	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

A Reconductoring project was completed 12/10/2014 to replace conductors which were causing the outages.

#### Corrective Actions Planned

No further action planned at this time.





## APPENDIX D

### Multi Year WPC Analysis and Remedial Action Report

**Circuit Number:** 734053  
**Division:** SEMO  
**ZIP Codes(s) Served:** 63833, 63862  
**Customers Served:** 48  
**Customer Interruptions (CI):** 4  
**SAIFI Value:** Y2013 - 2.06; Y2014 - 2.42; Y2015 - 0.08

#### Outage Analysis

Causes	2013 Total CI	2014 Total CI	2015 Total CI	2015 % Total CI	2015 # Incidents
ANIMALS	0	0	2	50.00%	2
EQUIPMENT/OH	48	8	1	25.00%	1
LIGHTNING	50	66	0	0.00%	0
PREARRANGED	0	0	1	25.00%	1
PUBLIC	1	0	0	0.00%	0
UNKNOWN	0	52	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

The repair work identified as a result of the 2013 Groundline inspection was completed in accordance with Ameren Missouri's infrastructure inspection policy. Air spoilers were installed in 2014 on the 34kV supply on WRs 2TSE106452 and 2TSE106631 to reduce galloping. Additional air spoilers and other anti-galloping hardware will be installed on the 12kV and the 34kV supply under WRs 2TSE110194 and 2TSE110195 in 2015.

#### Corrective Actions Planned

The existing Libourn switching station with three SCADA 34kV "Viper" automated switches on WR 2TSE112967.