



A Touchstone Energy Cooperative 

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COMMISSION

April 23, 2018

Ms. Talina Mathews
Commissioner
Kentucky Public Service Commission
P.O. Box 615
Frankfort, Kentucky 40602-0615

RE: Administrative Case No. 2011-00450

Dear Ms. Mathews,

Enclosed are the original and one (1) electronic copy of the 2018 Distribution Reliability Report, for Owen Electric Cooperative, as requested in the revisions to the aforementioned order.

Should you have any questions or need further information, please contact our office at 1-800-372-7612.

Sincerely,

A handwritten signature in black ink, appearing to read "Andrew Long". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Andrew Long
System Engineer

Enclosures

KENTUCKY PUBLIC SERVICE COMMISSION

Electric Distribution Utility Annual Reliability Report

SECTION 1: CONTACT INFORMATION

UTILITY NAME	Owen Electric Cooperative
REPORT PREPARED BY	Drew Long
E-MAIL ADDRESS OF PREPARER	along@owenelectric.com
PHONE NUMBER OF PREPARER	(502) 563-3522

SECTION 2: REPORT YEAR

CALENDAR YEAR OF REPORT	2018
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SECTION 3: MAJOR EVENT DAYS

T_{MED}	6.856
FIRST DATE USED TO DETERMINE T_{MED}	1-Jan-2013
LAST DATE USED TO DETERMINE T_{MED}	31-Dec-2017
NUMBER OF MED IN REPORT YEAR	5

NOTE: Per IEEE 1366 T_{MED} should be calculated using the daily SAIDI values for the five prior years. If five years of data are not available, then utilities should use what is available until five years are accumulated.

SECTION 4: SYSTEM RELIABILITY INFORMATION AND RESULTS

System-wide Information	
TOTAL CUSTOMERS	61,596
TOTAL CIRCUITS	129
Excluding MED	
5 YEAR AVERAGE	REPORTING YEAR
SAIDI	107.01
SAIFI	1.21
Including MED	
5 YEAR AVERAGE	REPORTING YEAR
SAIDI	184.31
SAIFI	1.38

Notes:

- 1) All duration indices (SAIDI) are to be reported in units of minutes.
- 2) Reports are due on the first business day of May of each year
- 3) Reports cover the calendar year ending in the December before the reports are due.
- 4) IEEE 1366 (latest version) is used to define SAIDI, SAIFI, and T_{MED}

Electric Distribution Utility Annual Reliability Report

Circuit # 1

5.1.1	SUBSTATION NAME AND NUMBER	BRISTOW II(56)
5.1.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Kenton
5.1.3	CIRCUIT NAME AND NUMBER	BRISTOW II(56), Circuit 7, 5607
5.1.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.1.5	TOTAL CIRCUIT LENGTH (MILES)	5.1
5.1.6	CUSTOMER COUNT FOR THIS CIRCUIT	494
5.1.7	DATE OF LAST CIRCUIT TRIM (VM)	2016

5.1.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause		SAIFI Contribution	SAIDI Contribution
Power Supplier	7	0.00%	0.00%
Birds/Animals		0.66%	1.32%
Equipment/Installation		0.00%	0.00%
Member/Public	5	75.58%	51.25%
R.O.W. Unpreventable		0.00%	0.00%
Scheduled		20.27%	25.08%
Unknown		0.00%	0.00%
Weather		0.50%	1.20%
Age/Deterioration		1.99%	17.85%
R.O.W. Preventable		1.00%	3.29%

5.1.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.154
5.1.10	REPORTING YEAR (SAIDI)	0.231
5.1.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.002
5.1.12	REPORTING YEAR (SAIFI)	0.010

5.1.13 CORRECTIVE ACTION PLAN:

Had 9 outages on this feeder. There were two planned outages to upgrade equipment and a dig in by a contractor that required an extensive outage for the conductor replacement. The member caused outage was the largest contributor and was the main cause of the SAIDI and SAIFI numbers being higher than the average. This is largely a suburban feeder with underground. Right of way isnt a large concern, but did have one outage among a few wildlife caused outages on riser poles.

Action Plan

None at this time. Scheduled outages were necessary and the dig in was preventable by the member.

Circuit # 2

5.2.1	SUBSTATION NAME AND NUMBER	BRISTOW II(56)
5.2.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Kenton
5.2.3	CIRCUIT NAME AND NUMBER	BRISTOW II(56), Circuit 5, 5605
5.2.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.2.5	TOTAL CIRCUIT LENGTH (MILES)	5.6
5.2.6	CUSTOMER COUNT FOR THIS CIRCUIT	73
5.2.7	DATE OF LAST CIRCUIT TRIM (VM)	2016

5.2.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	0.00%	0.00%
Equipment/Installation	0.00%	0.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	5.56%	3.49%
Unknown	50.00%	11.29%
Weather	0.00%	0.00%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	0.00%	0.00%

5.2.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.014
5.2.10	REPORTING YEAR (SAIDI)	0.015
5.2.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.000
5.2.12	REPORTING YEAR (SAIFI)	0.000

5.2.13 CORRECTIVE ACTION PLAN:

Overall this is a very reliable circuit as it has large portions of underground and is largely industrial/commercial. The SAIDI and SAIFI overall were still low and had 4 total outages throughout the year. With one being a brief scheduled outage. Overall this circuit remains in good condition and outages are kept to a minimum.

Action Plan

Continue to use new transformer wildlife protectors on any new transformer.

Circuit # 3

5.3.1	SUBSTATION NAME AND NUMBER	RICHARDSON II(55)
5.3.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Kenton
5.3.3	CIRCUIT NAME AND NUMBER	RICHARDSON II(55), Circuit 5, 5505
5.3.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.3.5	TOTAL CIRCUIT LENGTH (MILES)	7.4
5.3.6	CUSTOMER COUNT FOR THIS CIRCUIT	448
5.3.7	DATE OF LAST CIRCUIT TRIM (VM)	2017

5.3.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	8.70%	1.67%
Equipment/Installation	0.00%	0.00%
Member/Public	41.21%	32.53%
R.O.W. Unpreventable	0.37%	0.17%
Scheduled	0.00%	0.00%
Unknown	0.00%	0.00%
Weather	4.76%	1.62%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	0.00%	0.00%

5.3.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.501
5.3.10	REPORTING YEAR (SAIDI)	1.480
5.3.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.008
5.3.12	REPORTING YEAR (SAIFI)	0.010

5.3.13 CORRECTIVE ACTION PLAN:

Eleven outages occurred on this circuit for the time frame listed. A significant source was a Semi getting into the communication wire which took down the pole which the Power lines were attached. OEC continues to meet codes and update clearances where known and needed. Most of the outages didnt have a clear cause, but can be deduced to likely be wildlife induced.

Action Plan:

Continue to use new transformer wildlife protectors on any new transformer.

Circuit # 4

5.4.1	SUBSTATION NAME AND NUMBER	LONG LICK(29)
5.4.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Scott
5.4.3	CIRCUIT NAME AND NUMBER	LONG LICK(29), Circuit 4, 2904
5.4.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.4.5	TOTAL CIRCUIT LENGTH (MILES)	15.0
5.4.6	CUSTOMER COUNT FOR THIS CIRCUIT	711
5.4.7	DATE OF LAST CIRCUIT TRIM (VM)	2015

5.4.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	0.00%	0.00%
Equipment/Installation	0.00%	0.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	12.11%	3.59%
Unknown	2.08%	2.86%
Weather	85.70%	93.25%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	0.12%	0.30%

5.4.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.194
5.4.10	REPORTING YEAR (SAIDI)	0.658
5.4.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.003
5.4.12	REPORTING YEAR (SAIFI)	0.014

5.4.13 CORRECTIVE ACTION PLAN:

Nine outages occurred over 2018 for this circuit. Three were scheduled jobs, three weather related, one right of way, and two are unknown. Lightning appears to be the largest cause.

Action Plan

Evaluate Lightning arrestor placement to ensure greatest possible protection.

Circuit # 5

5.5.1	SUBSTATION NAME AND NUMBER	LONG LICK(29)
5.5.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Scott
5.5.3	CIRCUIT NAME AND NUMBER	LONG LICK(29), Circuit 3, 2903
5.5.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.5.5	TOTAL CIRCUIT LENGTH (MILES)	74.4
5.5.6	CUSTOMER COUNT FOR THIS CIRCUIT	618
5.5.7	DATE OF LAST CIRCUIT TRIM (VM)	2015

5.5.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	4.99%	1.95%
Equipment/Installation	0.78%	0.49%
Member/Public	3.90%	2.87%
R.O.W. Unpreventable	7.96%	5.70%
Scheduled	0.31%	0.10%
Unknown	23.24%	15.47%
Weather	41.19%	62.13%
Age/Deterioration	5.62%	3.30%
R.O.W. Preventable	12.01%	7.99%

5.5.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.041
5.5.10	REPORTING YEAR (SAIDI)	1.282
5.5.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.000
5.5.12	REPORTING YEAR (SAIFI)	0.010

5.5.13 CORRECTIVE ACTION PLAN:

This circuit had several outages of varying types. Though Right of Way seems to be a frequent offender, especially in conjunction with weather events.

Action Plan:

Continue with Right of Way program and spot cut as determined necessary by Right of Way Manager.

Circuit # 6

5.6.1	SUBSTATION NAME AND NUMBER	BELLEVIEW(27)
5.6.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Boone
5.6.3	CIRCUIT NAME AND NUMBER	BELLEVIEW(27), Circuit 4, 2704
5.6.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.6.5	TOTAL CIRCUIT LENGTH (MILES)	17.3
5.6.6	CUSTOMER COUNT FOR THIS CIRCUIT	161
5.6.7	DATE OF LAST CIRCUIT TRIM (VM)	2015

5.6.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	11.30%	5.15%
Equipment/Installation	30.56%	0.25%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	9.26%	7.14%
Scheduled	0.00%	0.00%
Unknown	0.00%	0.00%
Weather	2.78%	50.61%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	44.63%	22.67%

5.6.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.152
5.6.10	REPORTING YEAR (SAIDI)	0.928
5.6.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.002
5.6.12	REPORTING YEAR (SAIFI)	0.009

5.6.13 CORRECTIVE ACTION PLAN:

Sixteen outages and nearly all are right of way caused. This circuit is due to be trimmed this year, so ideally these outages will be reduced. A new right of way manager was also recently hired.

Action Plan:

Circuit Trim this feeder to reduce the number of right of way problems.

Circuit # 7

5.7.1	SUBSTATION NAME AND NUMBER	BELLEVIEW(27)
5.7.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Boone
5.7.3	CIRCUIT NAME AND NUMBER	BELLEVIEW(27), Circuit 3, 2703
5.7.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.7.5	TOTAL CIRCUIT LENGTH (MILES)	18.4
5.7.6	CUSTOMER COUNT FOR THIS CIRCUIT	160
5.7.7	DATE OF LAST CIRCUIT TRIM (VM)	2015

5.7.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	3.03%	1.82%
Equipment/Installation	0.00%	0.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	10.77%	7.97%
Scheduled	3.03%	1.85%
Unknown	7.74%	5.09%
Weather	72.73%	75.40%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	2.02%	4.43%

5.7.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.397
5.7.10	REPORTING YEAR (SAIDI)	0.595
5.7.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.003
5.7.12	REPORTING YEAR (SAIFI)	0.005

5.7.13 CORRECTIVE ACTION PLAN:

High Winds cause a plethora of outages on the system, mainly on two separate days that were the main drivers for the increased SAIDI and SAIFI numbers. The high winds caused several issues with trees that were out of the Right of Way. Ash Trees continued to be a factor, but a large portion have now been removed or fallen, so should continually see a decline in ash tree related problems.

Action Plan

Continue to Right of Way Cutting and spot cutting as the Right of Way Manager sees appropriate.

Circuit # 8

5.8.1	SUBSTATION NAME AND NUMBER	STERLING(25)
5.8.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Gallatin
5.8.3	CIRCUIT NAME AND NUMBER	STERLING(25), Circuit 4, 2504
5.8.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.8.5	TOTAL CIRCUIT LENGTH (MILES)	0.6
5.8.6	CUSTOMER COUNT FOR THIS CIRCUIT	1
5.8.7	DATE OF LAST CIRCUIT TRIM (VM)	2018

5.8.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	0.00%	0.00%
Equipment/Installation	0.00%	0.00%
Member/Public	100.00%	100.00%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	0.00%	0.00%
Unknown	0.00%	0.00%
Weather	0.00%	0.00%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	0.00%	0.00%

5.8.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.001
5.8.10	REPORTING YEAR (SAIDI)	0.016
5.8.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.000
5.8.12	REPORTING YEAR (SAIFI)	0.000

5.8.13 CORRECTIVE ACTION PLAN:

Overall a very reliable feeder that has minimum historic outages. A piece of equipment behind the primary meter failed causing the circuit to lockout which was the contributor to the SAIFI and minimum SAIDI.

Action Plan:

None at this time

Circuit # 9

5.9.1	SUBSTATION NAME AND NUMBER	BURLINGTON(24)
5.9.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Boone
5.9.3	CIRCUIT NAME AND NUMBER	BURLINGTON(24), Circuit 4, 2404
5.9.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.9.5	TOTAL CIRCUIT LENGTH (MILES)	15.9
5.9.6	CUSTOMER COUNT FOR THIS CIRCUIT	400
5.9.7	DATE OF LAST CIRCUIT TRIM (VM)	2018

5.9.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	3.60%	0.48%
Equipment/Installation	0.13%	0.04%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	12.98%	5.49%
Scheduled	0.00%	0.00%
Unknown	0.77%	0.12%
Weather	15.17%	10.04%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	4.50%	0.73%

5.9.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.568
5.9.10	REPORTING YEAR (SAIDI)	0.675
5.9.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.006
5.9.12	REPORTING YEAR (SAIFI)	0.005

5.9.13 CORRECTIVE ACTION PLAN:

Right of Way issues persisted, though circuit trimming has helped reduced the future number of these events. Several work requests were written to spot cut additionally needed areas. Furthermore, several of the trees were out of the right of way, making these outages harder to mitigate

Action Plan:
Continue to write necessary work requests to cut any additional areas that may be needed.

Circuit # 10

5.10.1	SUBSTATION NAME AND NUMBER	BAVARIAN(23)
5.10.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Boone
5.10.3	CIRCUIT NAME AND NUMBER	BAVARIAN(23), Circuit 1, 2301
5.10.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.10.5	TOTAL CIRCUIT LENGTH (MILES)	25.7
5.10.6	CUSTOMER COUNT FOR THIS CIRCUIT	412
5.10.7	DATE OF LAST CIRCUIT TRIM (VM)	2018

5.10.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	5.60%	2.09%
Equipment/Installation	1.06%	0.46%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	5.84%	4.93%
Scheduled	0.00%	0.00%
Unknown	0.97%	0.82%
Weather	34.66%	14.44%
Age/Deterioration	34.01%	51.27%
R.O.W. Preventable	4.79%	3.95%

5.10.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.495
5.10.10	REPORTING YEAR (SAIDI)	2.547
5.10.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.007
5.10.12	REPORTING YEAR (SAIFI)	0.017

5.10.13 CORRECTIVE ACTION PLAN:

Trees again were a large contributor to the overall SAIDI and SAIFI, as was the case for the last report. However, trees have been cut since and ideally the number of tree caused outages will continue to reduce. Weather was a large contributing factor, but with improved right of way, outages should continue to improve.

Action Plan:

Continue to write necessary work requests to remove any known problem areas.

Circuit # 11

5.11.1	SUBSTATION NAME AND NUMBER	HEBRON(22)
5.11.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Boone
5.11.3	CIRCUIT NAME AND NUMBER	HEBRON(22), Circuit 5, 2205
5.11.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.11.5	TOTAL CIRCUIT LENGTH (MILES)	5.5
5.11.6	CUSTOMER COUNT FOR THIS CIRCUIT	507
5.11.7	DATE OF LAST CIRCUIT TRIM (VM)	2015

5.11.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	0.00%	0.00%
Equipment/Installation	100.00%	100.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	0.00%	0.00%
Unknown	0.00%	0.00%
Weather	0.00%	0.00%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	0.00%	0.00%

5.11.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.022
5.11.10	REPORTING YEAR (SAIDI)	0.374
5.11.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.000
5.11.12	REPORTING YEAR (SAIFI)	0.008

5.11.13 CORRECTIVE ACTION PLAN:

An overall reliable feeder. This feeder only had one outage, though took out nearly all the members. Cause was equipment failure, but root cause was not able to be found. This feeder is relatively short and has a high population density with a large amount of underground.

Action Plan:

None at this time.

Circuit # 12

5.12.1	SUBSTATION NAME AND NUMBER	HEBRON(22)
5.12.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Boone
5.12.3	CIRCUIT NAME AND NUMBER	HEBRON(22), Circuit 4, 2204
5.12.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.12.5	TOTAL CIRCUIT LENGTH (MILES)	31.7
5.12.6	CUSTOMER COUNT FOR THIS CIRCUIT	685
5.12.7	DATE OF LAST CIRCUIT TRIM (VM)	2015

5.12.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	4.69%	2.22%
Equipment/Installation	48.99%	17.92%
Member/Public	2.67%	2.72%
R.O.W. Unpreventable	12.55%	11.73%
Scheduled	0.00%	0.00%
Unknown	1.52%	0.71%
Weather	21.93%	36.65%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	3.17%	2.75%

5.12.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.855
5.12.10	REPORTING YEAR (SAIDI)	1.931
5.12.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.009
5.12.12	REPORTING YEAR (SAIFI)	0.020

5.12.13 CORRECTIVE ACTION PLAN:

Several outages occurred throughout the year having a variety of cause codes. Weather and Right of way posed problems throughout the year and had a number of bird related outages as well. A significant outage was a device failure that led to large number of members without power.

Action Plan:

Right of Way has and will continue to cut as necessary on this circuit. Wildlife Guards will continue to be used on new transformers. Arrestors will be used as required by the RUS and NESC specifications to mitigate lightning outages.

Circuit # 13

5.13.1	SUBSTATION NAME AND NUMBER	HEBRON(22)
5.13.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Boone
5.13.3	CIRCUIT NAME AND NUMBER	HEBRON(22), Circuit 3, 2203
5.13.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.13.5	TOTAL CIRCUIT LENGTH (MILES)	27.8
5.13.6	CUSTOMER COUNT FOR THIS CIRCUIT	1561
5.13.7	DATE OF LAST CIRCUIT TRIM (VM)	2015

5.13.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	3.86%	3.82%
Equipment/Installation	90.41%	65.31%
Member/Public	0.06%	0.15%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	0.00%	0.00%
Unknown	1.52%	1.31%
Weather	2.81%	9.71%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	0.00%	0.00%

5.13.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.284
5.13.10	REPORTING YEAR (SAIDI)	1.485
5.13.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.006
5.13.12	REPORTING YEAR (SAIFI)	0.027

5.13.13 CORRECTIVE ACTION PLAN:

One major outage took all consumers offline for nearly an hour which was contributed to a failure of equipment before the first protective device. This was a substantial contributor to the overall SAIDI and contributed to the SAIFI as well. Several other weather related and bird outages occurred as well.

Action Plan:

Continue the current line inspection program to be proactive in catching failing equipment and continue to use wildlife guards on transformers.

Circuit # 14

5.14.1	SUBSTATION NAME AND NUMBER	NOEL(21)
5.14.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Grant
5.14.3	CIRCUIT NAME AND NUMBER	NOEL(21), Circuit 3, 2103
5.14.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.14.5	TOTAL CIRCUIT LENGTH (MILES)	59.7
5.14.6	CUSTOMER COUNT FOR THIS CIRCUIT	1116
5.14.7	DATE OF LAST CIRCUIT TRIM (VM)	2018

5.14.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	4.43%	1.37%
Equipment/Installation	6.08%	2.58%
Member/Public	18.02%	4.29%
R.O.W. Unpreventable	0.93%	0.46%
Scheduled	0.00%	0.00%
Unknown	3.40%	1.07%
Weather	13.08%	9.29%
Age/Deterioration	2.57%	1.33%
R.O.W. Preventable	1.96%	1.15%

5.14.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.339
5.14.10	REPORTING YEAR (SAIDI)	0.629
5.14.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.004
5.14.12	REPORTING YEAR (SAIFI)	0.008

5.14.13 CORRECTIVE ACTION PLAN:

A variety of outages occurred on the feeder throughout the year. A significant portion was induced by member causes, but there were also many weather and wildlife outages that occurred. All of the outages were well sectionalized reducing the number of members ultimately out. This is a fairly long feeder with significant exposure.

Action Plan:

Review sectionalizing to make sure outages are minimized to the smallest size possible.

Circuit # 15

5.15.1	SUBSTATION NAME AND NUMBER	NOEL(21)
5.15.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Grant
5.15.3	CIRCUIT NAME AND NUMBER	NOEL(21), Circuit 2, 2102
5.15.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.15.5	TOTAL CIRCUIT LENGTH (MILES)	82.9
5.15.6	CUSTOMER COUNT FOR THIS CIRCUIT	764
5.15.7	DATE OF LAST CIRCUIT TRIM (VM)	2015

5.15.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	9.56%	3.08%
Equipment/Installation	4.29%	1.06%
Member/Public	0.18%	0.05%
R.O.W. Unpreventable	0.09%	0.02%
Scheduled	0.00%	0.00%
Unknown	5.90%	2.38%
Weather	23.24%	19.55%
Age/Deterioration	0.09%	0.04%
R.O.W. Preventable	11.80%	6.47%

5.15.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	1.287
5.15.10	REPORTING YEAR (SAIDI)	1.038
5.15.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.009
5.15.12	REPORTING YEAR (SAIFI)	0.010

5.15.13 CORRECTIVE ACTION PLAN:

Weather and Right of way caused the most problems on this circuit. There was one outage caused by a tree that took the majority of the members on the feeder out for 278 minutes while the pole could be repaired adding to the overall SAIDI. The SAIDI is still below the 5 year reporting average, while the SAIFI is just above.

Action Plan:

Upgrading sectionlizing plane and replacing all hydraulic reclosers with electronic.

Circuit # 16

5.16.1	SUBSTATION NAME AND NUMBER	RICHARDSON(19)
5.16.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Kenton
5.16.3	CIRCUIT NAME AND NUMBER	RICHARDSON(19), Circuit 3, 1903
5.16.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.16.5	TOTAL CIRCUIT LENGTH (MILES)	18.7
5.16.6	CUSTOMER COUNT FOR THIS CIRCUIT	911
5.16.7	DATE OF LAST CIRCUIT TRIM (VM)	2017

5.16.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	0.22%	0.06%
Equipment/Installation	0.00%	0.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	0.00%	0.00%
Unknown	0.00%	0.00%
Weather	1.94%	1.33%
Age/Deterioration	0.05%	0.03%
R.O.W. Preventable	48.89%	12.56%

5.16.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	1.884
5.16.10	REPORTING YEAR (SAIDI)	0.831
5.16.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.015
5.16.12	REPORTING YEAR (SAIFI)	0.015

5.16.13 CORRECTIVE ACTION PLAN:

Nine outages occurred on this system for the year of 2018. One outage took all members out for multiple hours due to high winds and a tree breaking a pole. The right of way in this area was recently trimmed, but further trimming was needed to ensure this type of outage did not occur. Overall the SAIDI is down as compared to the five year reporting average and the SAIFI is nearly identical to the reporting frame.

Action Plan:

There are no additional plans in addition to maintaining Right of Way Trim Schedule and line inspection schedule.

Circuit # 17

5.17.1	SUBSTATION NAME AND NUMBER	GALLATIN(18)
5.17.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Gallatin
5.17.3	CIRCUIT NAME AND NUMBER	GALLATIN(18), Circuit 3, 1803
5.17.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.17.5	TOTAL CIRCUIT LENGTH (MILES)	59.8
5.17.6	CUSTOMER COUNT FOR THIS CIRCUIT	696
5.17.7	DATE OF LAST CIRCUIT TRIM (VM)	2017

5.17.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	15.00%	8.27%
Birds/Animals	3.13%	0.79%
Equipment/Installation	0.14%	0.08%
Member/Public	0.18%	0.24%
R.O.W. Unpreventable	2.19%	1.35%
Scheduled	2.62%	0.60%
Unknown	1.10%	0.46%
Weather	36.32%	53.92%
Age/Deterioration	15.37%	5.57%
R.O.W. Preventable	6.79%	5.69%

5.17.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	2.651
5.17.10	REPORTING YEAR (SAIDI)	8.404
5.17.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.029
5.17.12	REPORTING YEAR (SAIFI)	0.051

5.17.13 CORRECTIVE ACTION PLAN:

Several outages of various types occurred throughout the year to make this perform significantly worse in terms of SAIDI than in previous years. There were some non-MED flooding that caused extended outages for a select few members, that drove overall SAIDI up. Overall these were weather driven outages, with some right of way outages also contributing to the SAIDI numbers.

Action Plan:

Evaluate sectionalizing to reduce impact of flooding events and make maps to help predict where flood stages occur and what meters they will affect.

Circuit # 18

5.18.1	SUBSTATION NAME AND NUMBER	DURO(17)
5.18.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Kenton
5.18.3	CIRCUIT NAME AND NUMBER	DURO(17), Circuit 6, 1706
5.18.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.18.5	TOTAL CIRCUIT LENGTH (MILES)	11.7
5.18.6	CUSTOMER COUNT FOR THIS CIRCUIT	422
5.18.7	DATE OF LAST CIRCUIT TRIM (VM)	2017

5.18.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	0.43%	0.33%
Equipment/Installation	0.00%	0.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	0.00%	0.00%
Unknown	3.21%	1.86%
Weather	5.98%	7.36%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	90.38%	90.45%

5.18.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.027
5.18.10	REPORTING YEAR (SAIDI)	0.812
5.18.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.001
5.18.12	REPORTING YEAR (SAIFI)	0.008

5.18.13 CORRECTIVE ACTION PLAN:

Traditionally this has been a reliable feeder, this years SAIFI is up fairly significantly over the past years, with 7 total outages for the 2018 year. Right of Way was the major contributor to the outages present. The circuit was cut in 2017. A new right of way manager was hired and is trying to increase the overall effectiveness of the ROW program.

Action Plan:

Write necessary work orders to remove any problem trees still in the Right of Way as the circuit trim was completed last year.

Circuit # 19

5.28.5	SUBSTATION NAME AND NUMBER	SMOOT(16)
5.19.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Boone
5.19.3	CIRCUIT NAME AND NUMBER	SMOOT(16), Circuit 1, 1601
5.19.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.19.5	TOTAL CIRCUIT LENGTH (MILES)	8.4
5.19.6	CUSTOMER COUNT FOR THIS CIRCUIT	570
5.19.7	DATE OF LAST CIRCUIT TRIM (VM)	2017

5.19.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	0.00%	0.00%
Equipment/Installation	100.00%	100.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	0.00%	0.00%
Unknown	0.00%	0.00%
Weather	0.00%	0.00%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	0.00%	0.00%

5.19.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.020
5.19.10	REPORTING YEAR (SAIDI)	0.147
5.19.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.000
5.19.12	REPORTING YEAR (SAIFI)	0.002

5.19.13 CORRECTIVE ACTION PLAN:

Overall a reliable circuit that is relatively short and high in member density. Largely the only real contributor to the SAIDI and SAIFI was a blown elbow in a transformer which took 90 Consumers out for nearly two hours. There was only one other small outage during 2018 for this feeder

Action Plan:

No additional action taken on this circuit.

Circuit # 20

5.20.1	SUBSTATION NAME AND NUMBER	BRISTOW(14)
5.20.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Kenton
5.20.3	CIRCUIT NAME AND NUMBER	BRISTOW(14), Circuit 4, 1404
5.20.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.20.5	TOTAL CIRCUIT LENGTH (MILES)	23.2
5.20.6	CUSTOMER COUNT FOR THIS CIRCUIT	1809
5.20.7	DATE OF LAST CIRCUIT TRIM (VM)	2016

5.20.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	0.22%	0.11%
Equipment/Installation	23.74%	13.26%
Member/Public	23.37%	12.53%
R.O.W. Unpreventable	0.05%	0.04%
Scheduled	0.00%	0.00%
Unknown	2.49%	1.50%
Weather	23.53%	15.64%
Age/Deterioration	0.18%	0.29%
R.O.W. Preventable	1.02%	0.33%

5.20.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	5.330
5.20.10	REPORTING YEAR (SAIDI)	5.912
5.20.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.052
5.20.12	REPORTING YEAR (SAIFI)	0.093

5.20.13 CORRECTIVE ACTION PLAN:

There were four outages that took nearly all consumers out for an hour or more. This is a mostly underground feeder with some overhead taps. The feeder was recently resectionalized which ideally will help both the number of consumers out during an outage as well as reducing the duration.

Action Plan:

Action was recently completed in the last year to help better the circuit improvement.

Circuit # 21

5.21.1	SUBSTATION NAME AND NUMBER	KEITH(13)
5.21.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Owen
5.21.3	CIRCUIT NAME AND NUMBER	KEITH(13), Circuit 2, 1302
5.21.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.21.5	TOTAL CIRCUIT LENGTH (MILES)	46.9
5.21.6	CUSTOMER COUNT FOR THIS CIRCUIT	379
5.21.7	DATE OF LAST CIRCUIT TRIM (VM)	2016

5.21.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	52.68%	25.38%
Equipment/Installation	0.00%	0.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	2.35%	2.50%
Scheduled	4.70%	14.76%
Unknown	0.00%	0.00%
Weather	29.53%	44.67%
Age/Deterioration	0.34%	0.45%
R.O.W. Preventable	10.40%	12.24%

5.21.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.411
5.21.10	REPORTING YEAR (SAIDI)	0.574
5.21.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.007
5.21.12	REPORTING YEAR (SAIFI)	0.005

5.21.13 CORRECTIVE ACTION PLAN:

Overall this circuit is long with a significant amount of exposure. Several wildlife outages occurred on various parts of the feeder to increase the overall SAIDI as compared to the average five years. The SAIFI however is below the reporting years.

Action Plan:

Sectionalizing study to be completed as well as changing hydraulic OCR's to Electronic.

Circuit # 22

5.22.1	SUBSTATION NAME AND NUMBER	BIG BONE(12)
5.22.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Boone
5.22.3	CIRCUIT NAME AND NUMBER	BIG BONE(12), Circuit 1, 1201
5.22.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.22.5	TOTAL CIRCUIT LENGTH (MILES)	49.2
5.22.6	CUSTOMER COUNT FOR THIS CIRCUIT	580
5.22.7	DATE OF LAST CIRCUIT TRIM (VM)	2016

5.22.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	6.32%	0.44%
Equipment/Installation	1.10%	0.13%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	16.83%	3.04%
Scheduled	1.18%	0.10%
Unknown	2.06%	0.11%
Weather	38.94%	80.61%
Age/Deterioration	0.44%	0.07%
R.O.W. Preventable	12.93%	2.74%

5.22.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	1.731
5.22.10	REPORTING YEAR (SAIDI)	15.213
5.22.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.011
5.22.12	REPORTING YEAR (SAIFI)	0.015

5.22.13 CORRECTIVE ACTION PLAN:

Flooding occurred on a non-MED day which took 27 meters out for a couple days until the water receded. These meters are typically campsites and not normally used, especially during flooding. This skewed the overall SAIDI to a number significantly higher than would be typical.

Action Plan:

Evaluate flood prone meters and see if locations can be changed.

Circuit # 23

5.23.1	SUBSTATION NAME AND NUMBER	CARSON(11)
5.23.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Gallatin
5.23.3	CIRCUIT NAME AND NUMBER	CARSON(11), Circuit 2, 1102
5.23.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.23.5	TOTAL CIRCUIT LENGTH (MILES)	57.6
5.23.6	CUSTOMER COUNT FOR THIS CIRCUIT	493
5.23.7	DATE OF LAST CIRCUIT TRIM (VM)	2015

5.23.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	5.18%	1.00%
Equipment/Installation	0.00%	0.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	0.83%	0.32%
Scheduled	0.00%	0.00%
Unknown	7.13%	0.75%
Weather	19.29%	59.23%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	46.25%	19.71%

5.23.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	2.979
5.23.10	REPORTING YEAR (SAIDI)	7.267
5.23.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.024
5.23.12	REPORTING YEAR (SAIFI)	0.017

5.23.13 CORRECTIVE ACTION PLAN:

The main cause of the exaggerated SAIDI number is again a flood that was a non-MED day that had 19 meters out for several days until the water receded and the meters could be safely replaced. These are not homes, but camp like structures that do not have a permanent residence. SAIDI and SAIFI would have been below the report average if not for the flood.

Action Plan:

GIS made maps listing potential flood prone meters.

Circuit # 24

5.24.1	SUBSTATION NAME AND NUMBER	CARSON(11)
5.24.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Gallatin
5.24.3	CIRCUIT NAME AND NUMBER	CARSON(11), Circuit 1, 1101
5.24.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.24.5	TOTAL CIRCUIT LENGTH (MILES)	32.8
5.24.6	CUSTOMER COUNT FOR THIS CIRCUIT	214
5.24.7	DATE OF LAST CIRCUIT TRIM (VM)	2015

5.24.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	3.80%	1.79%
Equipment/Installation	0.00%	0.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	5.80%	2.42%
Scheduled	2.00%	0.35%
Unknown	9.20%	3.17%
Weather	59.40%	49.67%
Age/Deterioration	2.20%	0.08%
R.O.W. Preventable	0.80%	0.34%

5.24.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.593
5.24.10	REPORTING YEAR (SAIDI)	0.856
5.24.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.008
5.24.12	REPORTING YEAR (SAIFI)	0.006

5.24.13 CORRECTIVE ACTION PLAN:

SAIFI was actually below the reporting average with SAIDI being the value that flagged this circuit. Weather was the predominate cause creating several outages in various parts of the feeder.

Action Plan:

Continue with current right of way program, also plan to implement a new coordination scheme to help reduce number and duration of permanent outages.

Circuit # 25

5.25.1	SUBSTATION NAME AND NUMBER	TURKEYFOOT(10)
5.25.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Kenton
5.25.3	CIRCUIT NAME AND NUMBER	TURKEYFOOT(10), Circuit 3, 1003
5.25.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.25.5	TOTAL CIRCUIT LENGTH (MILES)	15.4
5.25.6	CUSTOMER COUNT FOR THIS CIRCUIT	816
5.25.7	DATE OF LAST CIRCUIT TRIM (VM)	2016

5.25.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	4.18%	1.92%
Equipment/Installation	0.09%	0.30%
Member/Public	90.24%	91.48%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	0.00%	0.00%
Unknown	1.83%	2.82%
Weather	0.35%	0.36%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	3.31%	3.12%

5.25.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.886
5.25.10	REPORTING YEAR (SAIDI)	1.169
5.25.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.013
5.25.12	REPORTING YEAR (SAIFI)	0.019

5.25.13 CORRECTIVE ACTION PLAN:

The main cause of this SAIDI and SAIFI being higher than the reporting average was due to a downed wire caused by the public. This caused nearly 800 people to be off for multiple hours.

Action Plan:

None at this time, however, engineering takes into consideration all NESC codes and RUS construction standards to ensure that power lines are constructed safely.

Circuit # 26

5.26.1	SUBSTATION NAME AND NUMBER	TURKEYFOOT(10)
5.26.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Kenton
5.26.3	CIRCUIT NAME AND NUMBER	TURKEYFOOT(10), Circuit 2, 1002
5.26.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.26.5	TOTAL CIRCUIT LENGTH (MILES)	2.6
5.26.6	CUSTOMER COUNT FOR THIS CIRCUIT	156
5.26.7	DATE OF LAST CIRCUIT TRIM (VM)	2016

5.26.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	0.00%	0.00%
Equipment/Installation	0.00%	0.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	0.00%	0.00%
Unknown	0.00%	0.00%
Weather	100.00%	100.00%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	0.00%	0.00%

5.26.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.117
5.26.10	REPORTING YEAR (SAIDI)	0.216
5.26.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.002
5.26.12	REPORTING YEAR (SAIFI)	0.004

5.26.13 CORRECTIVE ACTION PLAN:

Overall this is a fairly reliable circuit, which is only 2.6 miles long with not alot of exposure. There was only one outage that caused the SAIDI and SAIFI to be higher than the five year reporting average.

Action Plan:

Review over voltage protection plan on this feeder.

Circuit # 27

5.27.1	SUBSTATION NAME AND NUMBER	GRIFFIN(9)
5.27.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Pendelton
5.27.3	CIRCUIT NAME AND NUMBER	GRIFFIN(9), Circuit 4, 0904
5.27.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.27.5	TOTAL CIRCUIT LENGTH (MILES)	64.1
5.27.6	CUSTOMER COUNT FOR THIS CIRCUIT	550
5.27.7	DATE OF LAST CIRCUIT TRIM (VM)	2016

5.27.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	6.94%	6.04%
Equipment/Installation	0.43%	0.67%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	0.00%	0.00%
Unknown	61.17%	31.52%
Weather	30.59%	57.26%
Age/Deterioration	0.65%	0.54%
R.O.W. Preventable	0.00%	0.00%

5.27.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.441
5.27.10	REPORTING YEAR (SAIDI)	0.443
5.27.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.005
5.27.12	REPORTING YEAR (SAIFI)	0.007

5.27.13 CORRECTIVE ACTION PLAN:

Griffin is a long feeder that traverses through a more rural section of the cooperative with extensive exposure. Recently a new coordination scheme was implemented to try and reduce the extent and duration of the outages. Overall wildlife seems to be the biggest cause of outages on this feeder.

Action Plan:

Continue to implement wildlife protective devices where applicable.

Circuit # 28

5.28.1	SUBSTATION NAME AND NUMBER	GRIFFIN(9)
5.28.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Pendelton
5.28.3	CIRCUIT NAME AND NUMBER	GRIFFIN(9), Circuit 3, 0903
5.28.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.28.5	TOTAL CIRCUIT LENGTH (MILES)	22.4
5.28.6	CUSTOMER COUNT FOR THIS CIRCUIT	211
5.28.7	DATE OF LAST CIRCUIT TRIM (VM)	2015

5.28.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	0.00%	0.00%
Equipment/Installation	0.00%	0.00%
Member/Public	94.94%	85.34%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	0.00%	0.00%
Unknown	2.53%	2.43%
Weather	2.53%	12.23%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	0.00%	0.00%

5.28.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.438
5.28.10	REPORTING YEAR (SAIDI)	0.262
5.28.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.003
5.28.12	REPORTING YEAR (SAIFI)	0.005

5.28.13 CORRECTIVE ACTION PLAN:

A commercial consumer took out a pole near the substation which caused the feeder to lockout for an extended duration while repairs were made. While there were several other outages downline, this was the largest SAIDI and SAIFI contributor.

Action Plan:

A recoordination plan is scheduled to happen this year which will reduce the extent and duration of outages.

Circuit # 29

5.29.1	SUBSTATION NAME AND NUMBER	GRIFFIN(9)
5.29.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Pendelton
5.29.3	CIRCUIT NAME AND NUMBER	GRIFFIN(9), Circuit 2, 0902
5.29.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.29.5	TOTAL CIRCUIT LENGTH (MILES)	36.6
5.29.6	CUSTOMER COUNT FOR THIS CIRCUIT	330
5.29.7	DATE OF LAST CIRCUIT TRIM (VM)	2016

5.29.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	2.69%	0.96%
Equipment/Installation	0.00%	0.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	0.00%	0.00%
Unknown	0.00%	0.00%
Weather	97.31%	99.04%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	0.00%	0.00%

5.29.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.641
5.29.10	REPORTING YEAR (SAIDI)	1.453
5.29.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.006
5.29.12	REPORTING YEAR (SAIFI)	0.007

5.29.13 CORRECTIVE ACTION PLAN:

This is another long wooly feeder. Weather was the main cause of problems with several trees falling due to high winds that were out of the right of way. Several bird and animal outages also had an effect on the overall SAIDI and SAIFI for the reporting year.

Action Plan:

A recoordination plan is scheduled to happen this year which will reduce the extent and duration of outages.

Circuit # 30

5.30.1	SUBSTATION NAME AND NUMBER	BULLITTSVILLE(8)
5.30.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Boone
5.30.3	CIRCUIT NAME AND NUMBER	BULLITTSVILLE(8), Circuit 1, 0801
5.30.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.30.5	TOTAL CIRCUIT LENGTH (MILES)	46.1
5.30.6	CUSTOMER COUNT FOR THIS CIRCUIT	435
5.30.7	DATE OF LAST CIRCUIT TRIM (VM)	2015

5.30.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	20.16%	10.00%
Equipment/Installation	3.93%	1.07%
Member/Public	0.90%	1.30%
R.O.W. Unpreventable	0.08%	0.06%
Scheduled	0.00%	0.00%
Unknown	0.25%	0.11%
Weather	55.82%	34.66%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	6.56%	5.57%

5.30.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	1.013
5.30.10	REPORTING YEAR (SAIDI)	1.693
5.30.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.006
5.30.12	REPORTING YEAR (SAIFI)	0.017

5.30.13 CORRECTIVE ACTION PLAN:

Several outages occurred that were related to weather events. Trees in the right of way also posed a problem in addition to several wildlife related outages. Right of Way was last trimmed in 2015 and is due to be recut

Action Plan:

Continue with Right of Way program to help ensure trees remaining out of the right of way and look at current lightning protection on this circuit.

Circuit # 31

5.31.1	SUBSTATION NAME AND NUMBER	PENN(7)
5.31.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Scott
5.31.3	CIRCUIT NAME AND NUMBER	PENN(7), Circuit 2, 0702
5.31.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.31.5	TOTAL CIRCUIT LENGTH (MILES)	110.2
5.31.6	CUSTOMER COUNT FOR THIS CIRCUIT	738
5.31.7	DATE OF LAST CIRCUIT TRIM (VM)	2016

5.31.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	6.15%	1.58%
Equipment/Installation	0.00%	0.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	10.79%	4.73%
Scheduled	0.00%	0.00%
Unknown	14.62%	3.27%
Weather	45.77%	33.78%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	5.05%	1.26%

5.31.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.880
5.31.10	REPORTING YEAR (SAIDI)	1.755
5.31.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.009
5.31.12	REPORTING YEAR (SAIFI)	0.010

5.31.13 CORRECTIVE ACTION PLAN:

Mostly weather contributed to outages for the 2018 year with several right of way and bird outages. The right of way was cut in 2016 and while not scheduled for this year, spot cutting can occur to help reduce the overall tree related outages.

Action Plan:

Continue right of way program and create work orders as necessary to spot cut problem trees.

Circuit # 32

5.32.1	SUBSTATION NAME AND NUMBER	BROMLEY(6)
5.32.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Owen
5.32.3	CIRCUIT NAME AND NUMBER	BROMLEY(6), Circuit 3, 0603
5.32.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.32.5	TOTAL CIRCUIT LENGTH (MILES)	116.1
5.32.6	CUSTOMER COUNT FOR THIS CIRCUIT	588
5.32.7	DATE OF LAST CIRCUIT TRIM (VM)	2015

5.32.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	2.42%	0.60%
Equipment/Installation	2.06%	0.91%
Member/Public	0.06%	0.01%
R.O.W. Unpreventable	0.30%	0.23%
Scheduled	0.00%	0.00%
Unknown	0.18%	0.08%
Weather	53.66%	74.97%
Age/Deterioration	0.06%	0.01%
R.O.W. Preventable	1.94%	1.22%

5.32.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.672
5.32.10	REPORTING YEAR (SAIDI)	1.197
5.32.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.007
5.32.12	REPORTING YEAR (SAIFI)	0.007

5.32.13 CORRECTIVE ACTION PLAN:

There were several outages caused by high winds and lightning during a series of storms in this area. This is another feeder with significant exposure through a rural part of the cooperative

Action Plan:

Some Work Plan jobs to upgrade the circuit have been completed with more scheduled for this current year.

Circuit # 33

5.33.1	SUBSTATION NAME AND NUMBER	BROMLEY(6)
5.33.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Owen
5.33.3	CIRCUIT NAME AND NUMBER	BROMLEY(6), Circuit 1, 0601
5.33.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.33.5	TOTAL CIRCUIT LENGTH (MILES)	96.6
5.33.6	CUSTOMER COUNT FOR THIS CIRCUIT	879
5.33.7	DATE OF LAST CIRCUIT TRIM (VM)	2015

5.33.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	0.85%	0.26%
Equipment/Installation	0.00%	0.00%
Member/Public	6.94%	3.49%
R.O.W. Unpreventable	0.45%	0.41%
Scheduled	0.62%	0.54%
Unknown	4.68%	1.30%
Weather	57.45%	49.85%
Age/Deterioration	4.63%	3.18%
R.O.W. Preventable	0.56%	0.26%

5.33.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	1.197
5.33.10	REPORTING YEAR (SAIDI)	2.908
5.33.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.017
5.33.12	REPORTING YEAR (SAIFI)	0.019

5.33.13 CORRECTIVE ACTION PLAN:

There were several outages caused by high winds and lightning during a series of storms in this area.

Action Plan:

There are no plans at this time. However, OEC will continue the existing line inspection and ROW maintenance programs as well as review overvoltage protection in this area.

Circuit # 34

5.34.1	SUBSTATION NAME AND NUMBER	WILLIAMSTOWN(5)
5.34.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Grant
5.34.3	CIRCUIT NAME AND NUMBER	WILLIAMSTOWN(5), Circuit 7, 0507
5.34.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.34.5	TOTAL CIRCUIT LENGTH (MILES)	57.2
5.34.6	CUSTOMER COUNT FOR THIS CIRCUIT	955
5.34.7	DATE OF LAST CIRCUIT TRIM (VM)	2015

5.34.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	1.31%	0.51%
Equipment/Installation	31.82%	9.47%
Member/Public	0.07%	0.05%
R.O.W. Unpreventable	0.07%	0.04%
Scheduled	0.00%	0.00%
Unknown	33.43%	7.18%
Weather	6.76%	5.95%
Age/Deterioration	0.03%	0.10%
R.O.W. Preventable	0.00%	0.00%

5.34.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.132
5.34.10	REPORTING YEAR (SAIDI)	1.562
5.34.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.002
5.34.12	REPORTING YEAR (SAIFI)	0.036

5.34.13 CORRECTIVE ACTION PLAN:

Several outages occurred throughout the year which affected the overall SAIDI and SAIFI. A large portion was equipment failure, weather, and unknown sources likely stemming from wildlife.

Action Plan:

Electronic Reclosers replaced all of the Hydraulics in 2018 to help reduce equipment failure.

Circuit # 35

5.35.1	SUBSTATION NAME AND NUMBER	WILLIAMSTOWN(5)
5.35.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Grant
5.35.3	CIRCUIT NAME AND NUMBER	WILLIAMSTOWN(5), Circuit 6, 0506
5.35.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.35.5	TOTAL CIRCUIT LENGTH (MILES)	54.2
5.35.6	CUSTOMER COUNT FOR THIS CIRCUIT	644
5.35.7	DATE OF LAST CIRCUIT TRIM (VM)	2017

5.35.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	0.00%	0.00%
Equipment/Installation	58.37%	35.61%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	0.72%	0.83%
Unknown	9.82%	7.01%
Weather	23.78%	23.50%
Age/Deterioration	3.82%	1.58%
R.O.W. Preventable	0.00%	0.00%

5.35.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	1.422
5.35.10	REPORTING YEAR (SAIDI)	1.408
5.35.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.015
5.35.12	REPORTING YEAR (SAIFI)	0.024

5.35.13 CORRECTIVE ACTION PLAN:

Weather again was a significant contributor and accounts for most of the increased SAIDI and SAIFI number. Equipment was also a factor and was the majority of the overall SAIFI for this reporting period.

Action Plan:

Look to move the hydraulic replacement for Williamstown 506 to 2019 instead of 2020

Circuit # 36

5.36.1	SUBSTATION NAME AND NUMBER	WILLIAMSTOWN(5)
5.36.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Grant
5.36.3	CIRCUIT NAME AND NUMBER	WILLIAMSTOWN(5), Circuit 3, 0503
5.36.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.36.5	TOTAL CIRCUIT LENGTH (MILES)	73.7
5.36.6	CUSTOMER COUNT FOR THIS CIRCUIT	656
5.36.7	DATE OF LAST CIRCUIT TRIM (VM)	2018

5.36.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	1.51%	0.90%
Equipment/Installation	16.40%	3.52%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	1.80%	1.37%
Scheduled	0.17%	0.08%
Unknown	1.51%	1.51%
Weather	63.38%	45.05%
Age/Deterioration	0.06%	0.08%
R.O.W. Preventable	0.12%	0.29%

5.36.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.945
5.36.10	REPORTING YEAR (SAIDI)	1.355
5.36.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.009
5.36.12	REPORTING YEAR (SAIFI)	0.024

5.36.13 CORRECTIVE ACTION PLAN:

Weather again was a large contributor and right of way was a cause of the weather inducing outages. Circuit was trimmed in 2018 so expect to see a reduction in outages for 2019.

Action Plan:

Engineer a sectionalizing study to reduce duration and impact of outages.

Circuit # 37

5.37.1	SUBSTATION NAME AND NUMBER	MUNK(4)
5.37.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Gallatin
5.37.3	CIRCUIT NAME AND NUMBER	MUNK(4), Circuit 5, 0405
5.37.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.37.5	TOTAL CIRCUIT LENGTH (MILES)	1.8
5.37.6	CUSTOMER COUNT FOR THIS CIRCUIT	17
5.37.7	DATE OF LAST CIRCUIT TRIM (VM)	2017

5.37.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	0.00%	0.00%
Equipment/Installation	0.00%	0.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	0.00%	0.00%
Unknown	0.00%	0.00%
Weather	100.00%	100.00%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	0.00%	0.00%

5.37.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.007
5.37.10	REPORTING YEAR (SAIDI)	0.015
5.37.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.000
5.37.12	REPORTING YEAR (SAIFI)	0.000

5.37.13 CORRECTIVE ACTION PLAN:

Overall this is a very reliable circuit that is short and has little exposure. There was only one outage cause; weather. This outage only affected 16 members and were out for an hour.

Action Plan:

None at this time.

Circuit # 38

5.38.1	SUBSTATION NAME AND NUMBER	MUNK(4)
5.38.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Gallatin
5.38.3	CIRCUIT NAME AND NUMBER	MUNK(4), Circuit 4, 0404
5.38.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.38.5	TOTAL CIRCUIT LENGTH (MILES)	39.3
5.38.6	CUSTOMER COUNT FOR THIS CIRCUIT	346
5.38.7	DATE OF LAST CIRCUIT TRIM (VM)	2018

5.38.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	0.93%	0.24%
Equipment/Installation	0.00%	0.00%
Member/Public	9.96%	6.03%
R.O.W. Unpreventable	31.13%	24.74%
Scheduled	0.00%	0.00%
Unknown	1.32%	0.36%
Weather	30.27%	27.93%
Age/Deterioration	0.00%	0.00%
R.O.W. Preventable	17.43%	14.55%

5.38.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.950
5.38.10	REPORTING YEAR (SAIDI)	2.654
5.38.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.007
5.38.12	REPORTING YEAR (SAIFI)	0.019

5.38.13 CORRECTIVE ACTION PLAN:

Several cause codes were indicated driving up the SAIDI and SAIFI from the historical five year average. Right of way was a significant contributor in conjunction with the weather

Action Plan:

The right of way was cut in 2018, which should bring a reduction in outages for 2019.

Circuit # 39

5.39.1	SUBSTATION NAME AND NUMBER	MUNK(4)
5.39.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Gallatin
5.39.3	CIRCUIT NAME AND NUMBER	MUNK(4), Circuit 3, 0403
5.39.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.39.5	TOTAL CIRCUIT LENGTH (MILES)	51.8
5.39.6	CUSTOMER COUNT FOR THIS CIRCUIT	547
5.39.7	DATE OF LAST CIRCUIT TRIM (VM)	2018

5.39.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	1.14%	0.18%
Equipment/Installation	3.31%	1.63%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	1.62%	0.75%
Scheduled	0.00%	0.00%
Unknown	0.06%	0.05%
Weather	44.53%	15.69%
Age/Deterioration	0.06%	0.03%
R.O.W. Preventable	4.32%	0.85%

5.39.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	2.915
5.39.10	REPORTING YEAR (SAIDI)	2.586
5.39.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.024
5.39.12	REPORTING YEAR (SAIFI)	0.026

5.39.13 CORRECTIVE ACTION PLAN:

High Winds has an adverse affect on this circuit for the reporting year. This in addition to right of way were the leading caused of outages driving up the SAIFI and SAIDI numbers. However right of way was trimmed in 2018, which should lead to a reduction in outages for 2019.

Action Plan:

None at this time as right of way was just trimmed.

Circuit # 40

5.40.1	SUBSTATION NAME AND NUMBER	MUNK(4)
5.40.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Gallatin
5.40.3	CIRCUIT NAME AND NUMBER	MUNK(4), Circuit 2, 0402
5.40.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.40.5	TOTAL CIRCUIT LENGTH (MILES)	28.6
5.40.6	CUSTOMER COUNT FOR THIS CIRCUIT	322
5.40.7	DATE OF LAST CIRCUIT TRIM (VM)	2016

5.40.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	0.34%	0.07%
Equipment/Installation	0.00%	0.00%
Member/Public	0.09%	0.02%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	0.00%	0.00%
Unknown	4.62%	1.18%
Weather	27.80%	17.22%
Age/Deterioration	0.09%	0.02%
R.O.W. Preventable	5.30%	1.65%

5.40.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.753
5.40.10	REPORTING YEAR (SAIDI)	0.942
5.40.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.008
5.40.12	REPORTING YEAR (SAIFI)	0.007

5.40.13 CORRECTIVE ACTION PLAN:

Inclement weather was the major cause of outages in addition to having Right of Way Problems

Action Plan:

Right of Way manager to determine what needs spot trimmed as this circuit is not readily in the queue.

Circuit # 41

5.41.1	SUBSTATION NAME AND NUMBER	MUNK(4)
5.41.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Gallatin
5.41.3	CIRCUIT NAME AND NUMBER	MUNK(4), Circuit 1, 0401
5.41.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.41.5	TOTAL CIRCUIT LENGTH (MILES)	25.2
5.41.6	CUSTOMER COUNT FOR THIS CIRCUIT	412
5.41.7	DATE OF LAST CIRCUIT TRIM (VM)	2017

5.41.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	54.65%	47.62%
Equipment/Installation	29.22%	12.99%
Member/Public	0.22%	0.15%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	4.76%	1.19%
Unknown	2.49%	3.06%
Weather	4.11%	11.84%
Age/Deterioration	0.11%	0.66%
R.O.W. Preventable	2.49%	6.53%

5.41.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.938
5.41.10	REPORTING YEAR (SAIDI)	0.717
5.41.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.010
5.41.12	REPORTING YEAR (SAIFI)	0.014

5.41.13 CORRECTIVE ACTION PLAN:

Willife outages were the main cause of the SAIDI and SAIFI to be driven up for the reporting year. Weather and scheduled outages also played a part.

Action Plan:

Continue to install wildlife protection where adequate and on new transformers.

Circuit # 42

5.42.1	SUBSTATION NAME AND NUMBER	BANKLICK(2)
5.42.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Kenton
5.42.3	CIRCUIT NAME AND NUMBER	BANKLICK(2), Circuit 6, 0206
5.42.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.42.5	TOTAL CIRCUIT LENGTH (MILES)	16.9
5.42.6	CUSTOMER COUNT FOR THIS CIRCUIT	949
5.42.7	DATE OF LAST CIRCUIT TRIM (VM)	2014

5.42.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	3.36%	3.25%
Equipment/Installation	0.00%	0.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	9.24%	7.41%
Scheduled	0.00%	0.00%
Unknown	0.84%	1.15%
Weather	55.46%	64.51%
Age/Deterioration	0.84%	1.84%
R.O.W. Preventable	30.25%	21.84%

5.42.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.131
5.42.10	REPORTING YEAR (SAIDI)	0.135
5.42.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.003
5.42.12	REPORTING YEAR (SAIFI)	0.002

5.42.13 CORRECTIVE ACTION PLAN:

Overall a fairly reliable circuit. Weather and Right of Way were the main contributors. Right of way was last cut 2014 so is due to be cut again which should reduce the overall outages on this circuit.

Action Plan:

Circuit trim as needed to reduce right of way outages.

Circuit # 43

5.43.1	SUBSTATION NAME AND NUMBER	BANKLICK(2)
5.43.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Kenton
5.43.3	CIRCUIT NAME AND NUMBER	BANKLICK(2), Circuit 3, 0203
5.43.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.43.5	TOTAL CIRCUIT LENGTH (MILES)	38.1
5.43.6	CUSTOMER COUNT FOR THIS CIRCUIT	407
5.43.7	DATE OF LAST CIRCUIT TRIM (VM)	2018

5.43.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	3.27%	1.09%
Equipment/Installation	0.00%	0.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	9.45%	4.70%
Scheduled	0.00%	0.00%
Unknown	5.18%	2.74%
Weather	67.05%	62.51%
Age/Deterioration	3.62%	6.41%
R.O.W. Preventable	6.11%	7.52%

5.43.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	1.003
5.43.10	REPORTING YEAR (SAIDI)	2.843
5.43.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.012
5.43.12	REPORTING YEAR (SAIFI)	0.021

5.43.13 CORRECTIVE ACTION PLAN:

Weather again, mainly the high winds, adversely affected the feeder. Right of way also was a factor, but was recently trimmed so 2019 should have fewer outages due to these codes.

Action Plan:

Nothing at this time as Right of Way Trim was recently completed.

Circuit # 44

5.44.1	SUBSTATION NAME AND NUMBER	BANKLICK(2)
5.44.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Kenton
5.44.3	CIRCUIT NAME AND NUMBER	BANKLICK(2), Circuit 2, 0202
5.44.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.44.5	TOTAL CIRCUIT LENGTH (MILES)	66.9
5.44.6	CUSTOMER COUNT FOR THIS CIRCUIT	944
5.44.7	DATE OF LAST CIRCUIT TRIM (VM)	2018

5.44.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	3.78%	1.46%
Equipment/Installation	0.00%	0.00%
Member/Public	0.83%	0.57%
R.O.W. Unpreventable	8.73%	12.71%
Scheduled	0.00%	0.00%
Unknown	44.31%	10.56%
Weather	28.93%	42.47%
Age/Deterioration	0.17%	0.17%
R.O.W. Preventable	8.04%	7.83%

5.44.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	2.677
5.44.10	REPORTING YEAR (SAIDI)	2.823
5.44.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.024
5.44.12	REPORTING YEAR (SAIFI)	0.035

5.44.13 CORRECTIVE ACTION PLAN:

Weather and Right of Way problems were the cause of SAIDI and SAIFI being higher than the rolling five year average.

Action plan:

Right of way was cut in 2018, which will help with right of way issues and line inspection will continue as normal.

Circuit # 45

5.45.1	SUBSTATION NAME AND NUMBER	BOONE(1)
5.45.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Boone
5.45.3	CIRCUIT NAME AND NUMBER	BOONE(1), Circuit 5, 0105
5.45.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.45.5	TOTAL CIRCUIT LENGTH (MILES)	31.5
5.45.6	CUSTOMER COUNT FOR THIS CIRCUIT	1744
5.45.7	DATE OF LAST CIRCUIT TRIM (VM)	2017

5.45.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	1.45%	1.56%
Equipment/Installation	0.00%	0.00%
Member/Public	0.19%	0.45%
R.O.W. Unpreventable	0.00%	0.00%
Scheduled	1.40%	9.49%
Unknown	0.58%	0.71%
Weather	0.53%	2.13%
Age/Deterioration	6.86%	24.68%
R.O.W. Preventable	88.36%	36.26%

5.45.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	2.438
5.45.10	REPORTING YEAR (SAIDI)	1.172
5.45.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.022
5.45.12	REPORTING YEAR (SAIFI)	0.033

5.45.13 CORRECTIVE ACTION PLAN:

Overall this tends to be a fairly reliable circuit, however, this year several right of way issues caused the SAIDI and SAIFI to be higher than the rolling 5 year average. The right of way was just cut in 2017 so spot checking appears needed.

Action Plan:

Right of Way manager to determine area of need for spot trimming.

Circuit # 46

5.46.1	SUBSTATION NAME AND NUMBER	BOONE(1)
5.46.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Boone
5.46.3	CIRCUIT NAME AND NUMBER	BOONE(1), Circuit 3, 0103
5.46.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.46.5	TOTAL CIRCUIT LENGTH (MILES)	16.7
5.46.6	CUSTOMER COUNT FOR THIS CIRCUIT	819
5.46.7	DATE OF LAST CIRCUIT TRIM (VM)	2017

5.46.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	2.78%	0.36%
Equipment/Installation	23.61%	1.93%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	18.06%	19.19%
Scheduled	0.00%	0.00%
Unknown	8.33%	1.31%
Weather	20.83%	24.00%
Age/Deterioration	2.78%	1.36%
R.O.W. Preventable	0.00%	0.00%

5.46.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.174
5.46.10	REPORTING YEAR (SAIDI)	0.196
5.46.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.004
5.46.12	REPORTING YEAR (SAIFI)	0.001

5.46.13 CORRECTIVE ACTION PLAN:

The weather, with high winds caused several outages and trees to fall inducing more outages. The trim was recently completed in 2017.

Action Plan:

Right of Way manager to spot check area of needs for tree trimming as circuit trimming was recently complete.

Circuit # 47

5.47.1	SUBSTATION NAME AND NUMBER	BOONE(1)
5.47.2	SUBSTATION LOCATION (COUNTY-ROAD-TOWN)	Boone
5.47.3	CIRCUIT NAME AND NUMBER	BOONE(1), Circuit 1, 0101
5.47.4	CIRCUIT LOCATION (TOWN-ROAD-GENERAL AREA)	See Coop.
5.47.5	TOTAL CIRCUIT LENGTH (MILES)	31.1
5.47.6	CUSTOMER COUNT FOR THIS CIRCUIT	345
5.47.7	DATE OF LAST CIRCUIT TRIM (VM)	2017

5.47.23 LIST OF OUTAGE CAUSES FOR CIRCUIT ALONG WITH PERCENTAGE OF TOTAL OUTAGE NUMBERS REPRESENTED BY EACH CAUSE

Outage Cause	SAIFI Contribution	SAIDI Contribution
Power Supplier	0.00%	0.00%
Birds/Animals	55.29%	33.06%
Equipment/Installation	0.00%	0.00%
Member/Public	0.00%	0.00%
R.O.W. Unpreventable	3.43%	4.93%
Scheduled	0.00%	0.00%
Unknown	3.73%	1.63%
Weather	28.02%	19.76%
Age/Deterioration	0.30%	0.61%
R.O.W. Preventable	3.28%	2.20%

5.47.9	CIRCUIT 5 YEAR AVERAGE (SAIDI)	0.619
5.47.10	REPORTING YEAR (SAIDI)	0.999
5.47.11	CIRCUIT 5 YEAR AVERAGE (SAIFI)	0.005
5.47.12	REPORTING YEAR (SAIFI)	0.010

5.47.13 CORRECTIVE ACTION PLAN:

Weather and wildlife were the main contributors. A coordination study was planned for 2019 and will be completed to help reduce outages and help to quickly restore them should the faults be permanent.

Action Plan:
Recoordination study to be completed to reduce impact and duration of outages. Continue to install wildlife protection as needed.

KENTUCKY PUBLIC SERVICE COMMISSION

Electric Distribution Utility Annual Reliability Report

Additional pages may be attached as necessary

SECTION 6: VEGETATION MANAGEMENT PLAN REVIEW

INCLUDE CURRENT VEGETATION MANAGEMENT PLAN

Additional pages may be attached as necessary

OEC'S Vegetation Management Plan, depending on budget and need, is an aggressive 4-yr. trim cycle covering our operating territory. OEC maintains a 2-yr intermediate trim cycle on all three-phase line extending from the substation to at least the first set of breakers and generally includes all of the three-phase line. A new Right of Way manager was recently hired to help continue to aggressively pursue right of way outages

In 2015 we developed a Dead Ash Tree Policy. Additional machinery and manpower were brought on board for what is expected to be a 2-yr. eradication process of all ash trees in OEC rights-of-ways. Three phase lines will be cleared of ash trees first, then an evaluation will be done on single phase lines, then single phase taps.

Owen Electric employs a comprehensive IVM program using manual, mechanical, and chemical methods to control problematic trees and brush based on environmental impact, safety, effectiveness, and cost. Our herbicide program is a 4-yr cycle also, allowing OEC to apply the proper herbicides to a circuit that was trimmed the previous year. Our vegetation management plan is fluid and can be adjusted easily to allow for rainfall, drought, and differences in soil fertility and soil structure. If a circuit needs attention sooner than scheduled, or later, it can easily be done.

KENTUCKY PUBLIC SERVICE COMMISSION

SECTION 7: UTILITY COMMENTS

During the course of 2018 OEC continued to support several initiatives designed to minimize the extent of outages and speed in the restoration of outages caused by weather. Owen Electric's Feeder Hardening program is in its eighth year. OEC has also implemented an ongoing over-current protection review of each feeder prioritized by operational feedback and length of feeder. These programs will continue into the 2018-2019 Construction Work Plan.

We continue to operate two self healing sites to provide backup power to critical Sanitation District plants.

OEC, in cooperation with EKPC, has completed a new substation in our southern territory that reduced exposure on a long rural 25kv circuits which should improve reliability significantly for our membership in this area of our service territory. 2017 was the first full operating year of the LongLick Substation.

OEC continues working on future plans to address other feeders with plans for new substations that will shorten the feeder lengths and provide improvements in reliability. Until these substations can be implemented, initiatives such as feeder hardening, focused ROW clearing, and increased sectionalizing will continue to be considered.

A program to remove hydraulic reclosers and replace with electronic as well as increasing the number of new sectionalizing studies a year has also been implemented.