

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

DUKE ENERGY KENTUCKY, INC.
RELIABILITY REPORT AND VEGETATION MANAGEMENT PLAN UPDATE FOR
CALENDAR YEAR 2023

May 1, 2024

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I. Introduction

On May 30, 2013, the Commission issued its Order requiring all jurisdictional utilities to file annual reliability reports and to develop vegetation management plans. Pursuant to the Order, jurisdictional utilities were required to report a 5 year average of reliability data. The reports are required to be based upon a calendar year (January to December) and filed by the first business day in May in the year immediately following the reporting year.

Duke Energy Kentucky, Inc. (Duke Energy Kentucky or the Company) submits its Reliability Report and Vegetation Management Plan update for Calendar year 2023 as required by the Commission's May 30, 2013 Order in Case No. 2011-00450.¹

II. Reliability Report Summary

Consistent with the most recent edition of the standard number 1366 "Guide for Electric Power Distribution Reliability Indices," and the Commission's Order,² the following is included in Exhibit A of Duke Energy Kentucky's Reliability Report Summary:

1. Calculate the System Average Interruption Duration Index (SAIDI) system-wide indices including Major Event Days (MEDs) and calculate the SAIDI system-wide indices excluding MEDs;
2. Calculate the System Average Interruption Frequency Index (SAIFI) system-wide indices including MEDs and calculate the SAIFI system-wide indices excluding MEDs;
3. Develop a system-wide rolling five-year average SAIDI excluding MEDs;
4. Develop a system-wide rolling five-year average SAIFI excluding MEDs;
5. Calculate SAIDI excluding MEDs for every circuit within its system;

¹ *In the matter of An Investigation of the Reliability Measures of Kentucky's Jurisdictional Electric Distribution Utilities, Case No. 2011-00450, Order (May 30, 2013).*

² *Id.*

6. Develop a rolling five-year average SAIDI for each circuit within its system;
7. Compare each circuit to that circuit's rolling five-year average SAIDI;
8. Calculate SAIFI excluding MEDs for every circuit within its system;
9. Develop a rolling five-year average SAIFI for each circuit within its system;
10. Compare each circuit to that circuit's rolling five-year average SAIFI.
11. File a Reliability Report by May 1 of each year, containing the reliability information as outlined in the attached Appendix for the preceding calendar year from January 1 to December 31 that includes the SAIDI and SAIFI system-wide indices, both including and excluding MEDs.
12. For each circuit with either SAIDI or SAIFI value higher than that circuit's respective SAIDI or SAIFI rolling five-year average, excluding MEDs, include in the annual Reliability Report the following information:
 - a. The circuit's SAIDI index for the year;
 - b. The circuit's SAIFI index for the year;
 - c. The circuit's rolling five-year average SAIDI;
 - d. The circuit's rolling five-year average SAIFI;
 - e. The substation name, number and location (i.e., County-Road-Town);
 - f. The circuit name, number and location (Town-Road-General Area);
 - g. The circuit's overall length in miles to the nearest tenth of a mile;
 - h. The number of customers served on the circuit for the year;
 - i. The date of the last circuit trim performed by the utility as part of its vegetation management plan;

- j. A list of outage causes for the circuit, along with the percentage of total outage numbers represented by each cause;
- k. Circuit five-year average SAIDI;
- l. Reporting year SAIDI;
- m. Circuit five-year average SAIFI;
- n. Reporting year SAIFI;
- o. A Corrective Action Plan which describes any measures the utility has completed or plans to complete to improve the circuit's performance; and
- p. Any other information the utility believes will assist the Commission in understanding the circumstances surrounding the circuit's performance.

III. Vegetation Management Plan Update and Summary

Duke Energy Kentucky filed its initial Vegetation Management Plan with this Commission on December 18, 2007 in Case No. 2006-00494.³ Duke Energy's Midwest Vegetation Management Group is responsible for controlling vegetation growth for approximately 1,550 miles of transmission and distribution primary overhead electric lines in Kentucky.

Exhibit B is a current copy of Duke Energy Kentucky's Vegetation Management Plan. This plan has been reformatted from prior versions and includes wordsmithing updates to provide further clarifications and cross-jurisdictional consistency with Duke Energy's other vegetation management programs.

As part of its 2024 plan, Duke Energy Kentucky plans to trim trees and maintain vegetation along 315 miles of its distribution system. The Company is on track with its

³ *Id.*

Vegetation Plan for 2024. As of March 31, 2024 Duke Energy Kentucky has completed approximately 25% of its scheduled trimming, or approximately 80 miles of its distribution system. This leaves approximately 235 miles to be trimmed in 2024. The Company does not anticipate any difficulty in completing all planned trimming for 2024. The Company anticipates it will have sufficient crew coverage throughout the year.

Respectfully submitted,

DUKE ENERGY KENTUCKY, INC.

/s/ Rocco D'Ascenzo

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KENTUCKY PUBLIC SERVICE COMMISSION
Electric Distribution Utility Annual Reliability Report

SECTION 1: CONTACT INFORMATION

UTILITY NAME	DUKE ENERGY KENTUCKY
REPORT PREPARED BY	MATTHEW G. DOYLE
E-MAIL ADDRESS OF PREPARER	Matthew.Doyle2@duke-energy.com
PHONE NUMBER OF PREPARER	513-335-5829

SECTION 2: REPORTING YEAR

CALENDAR YEAR OF REPORT	2023
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SECTION 3: MAJOR EVENT DAYS (MED)

TMED	4.9232
FIRST DATE USED TO DETERMINE TMED	January 1, 2017
LAST DATE USED TO DETERMINE TMED	December 31, 2021
NUMBER OF MED IN REPORT YEAR	9

NOTE: Per IEEE 1366 TMED 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	147,010	TOTAL CIRCUITS	154
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Excluding MED

5 YEAR AVERAGE		REPORTING YEAR	
SAIDI	97.62	SAIDI	92.47
SAIFI	0.81	SAIFI	0.57

Including MED

5 YEAR AVERAGE		REPORTING YEAR	
SAIDI	175.18	SAIDI	302.69
SAIFI	1.00	SAIFI	1.09

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 TMED

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CIRCUIT NUMBER	SUBSTATION NAME	SUBSTATION NUMBER	SUBSTATION COUNTY	SUBSTATION ROAD	SUBSTATION TOWN	CIRCUIT NAME	CIRCUIT ID	CIRCUIT NUMBER	CIRCUIT TOWN
H9320780042	AUGUSTINE	78	KENTON		COVINGTON	AUGUSTINE 42	H9320780042	42	COVINGTON
H9320780043	AUGUSTINE	78	KENTON		COVINGTON	AUGUSTINE 43	H9320780043	43	COVINGTON
H9320780044	AUGUSTINE	78	KENTON		COVINGTON	AUGUSTINE 44	H9320780044	44	COVINGTON
H9320780045	AUGUSTINE	78	KENTON		COVINGTON	AUGUSTINE 45	H9320780045	45	COVINGTON
H9321310043	BELLEVUE	131	CAMPBELL		NEWPORT	BELLEVUE 43	H9321310043	43	BELLEVUE
H9321320041	COLD SPRING	132	CAMPBELL		COLD SPRINGS	COLD SPRING 41	H9321320041	41	COLD SPRINGS
H9321320042	COLD SPRING	132	CAMPBELL		COLD SPRINGS	COLD SPRING 42	H9321320042	42	COLD SPRINGS
H9320420041	CONSTANCE	42	BOONE		ERLANGER	CONSTANCE 41	H9320420041	41	TAYLORSPO
H9320420042	CONSTANCE	42	BOONE		ERLANGER	CONSTANCE 42	H9320420042	42	VILLA HILLS
H9322170041	COVINGTON KY	217	KENTON		COVINGTON	COVINGTON 41	H9322170041	41	COVINGTON
H9322170043	COVINGTON KY	217	KENTON		COVINGTON	COVINGTON 43	H9322170043	43	COVINGTON
H9320700042	CRESCENT	70	KENTON		FT. MITCHELL	CRESCENT 42	H9320700042	42	FT. MITCHELL
H9320700046	CRESCENT	70	KENTON		FT. MITCHELL	CRESCENT 46	H9320700046	46	FT. MITCHELL
H9321240041	CRITTENDEN	124	GRANT		CRITTENDEN	CRITTENDEN 41	H9321240041	41	CRITTENDEN
H9320890041	DIXIE	89	BOONE		FLORENCE	DIXIE 41	H9320890041	41	FLORENCE
H9320890043	DIXIE	89	BOONE		FLORENCE	DIXIE 43	H9320890043	43	DIXIE HWY
H9320890045	DIXIE	89	BOONE		FLORENCE	DIXIE 45	H9320890045	45	FLORENCE
H9320550043	DONALDSON	55	KENTON		ERLANGER	DONALDSON 43	H9320550043	43	ERLANGER
H9320550044	DONALDSON	55	KENTON		ERLANGER	DONALDSON 44	H9320550044	44	ERLANGER
H9320550047	DONALDSON	55	KENTON		ERLANGER	DONALDSON 47	H9320550047	47	ERLANGER
H9322890041	EMPIRE	289	BOONE		FLORENCE	EMPIRE 41	H9322890041	41	FLORENCE
H9322890042	EMPIRE	289	BOONE		FLORENCE	EMPIRE 42	H9322890042	42	FLORENCE
H9322410042	FLORENCE	241	BOONE		FLORENCE	FLORENCE 42	H9322410042	42	FLORENCE
H9322410044	FLORENCE	241	BOONE		FLORENCE	FLORENCE 44	H9322410044	44	FLORENCE
H9321280045	HANDS	128	KENTON		COVINGTON	HANDS 45	H9321280045	45	TAYLOR MILL
H9321520042	HEBRON	152	BOONE		HEBRON	HEBRON 42	H9321520042	42	PETERSBURG
H9320090041	KENTON	9	KENTON		LAKEVIEW	KENTON 41	H9320090041	41	FT. WRIGHT
H9320090042	KENTON	9	KENTON		LAKEVIEW	KENTON 42	H9320090042	42	TAYLOR MILL
H9322870041	KENTUCKY UNIVERSITY	287	CAMPBELL		NEWPORT	KY UNIV 41	H9322870041	41	HIGHLAND HEIGHTS
H9322870042	KENTUCKY UNIVERSITY	287	CAMPBELL		NEWPORT	KY UNIV 42	H9322870042	42	HIGHLAND HEIGHTS
H9322870043	KENTUCKY UNIVERSITY	287	CAMPBELL		NEWPORT	KY UNIV 43	H9322870043	43	HIGHLAND HEIGHTS
H9322870044	KENTUCKY UNIVERSITY	287	CAMPBELL		NEWPORT	KY UNIV 44	H9322870044	44	HIGHLAND HEIGHTS
H9322870045	KENTUCKY UNIVERSITY	287	CAMPBELL		NEWPORT	KY UNIV 45	H9322870045	45	HIGHLAND HEIGHTS
H9321890041	LIMABURG	189	BOONE		LIMABURG	LIMABURG 41	H9321890041	41	HEBRON
H9321890042	LIMABURG	189	BOONE		LIMABURG	LIMABURG 42	H9321890042	42	LIMABURG
H9320980044	LONGBRANCH	98	BOONE		FLORENCE	LONGBRANCH 44	H9320980044	44	UNION
H9323580041	MARSHALL	358	CAMPBELL		HIGHLAND HEIGHTS	MARSHALL 41	H9323580041	41	HIGHLAND HEIGHTS
H9323050042	MT ZION	305	BOONE		FLORENCE	MT ZION 42	H9323050042	42	FLORENCE
H9323050044	MT ZION	305	BOONE		FLORENCE	MT ZION 44	H9323050044	44	FLORENCE
H9321990042	RICHWOOD	199	BOONE		RICHWOOD	RICHWOOD 42	H9321990042	42	RICHWOOD
H9321250041	VERONA	125	KENTON		CRITTENDEN	VERONA 41	H9321250041	41	DIXIE HWY
H9321250043	VERONA	125	KENTON		CRITTENDEN	VERONA 43	H9321250043	43	WALTON
H9322430041	VILLA	243	KENTON		EDGEWOOD	VILLA 41	H9322430041	41	CRESTVIEW HILLS
H9322430042	VILLA	243	KENTON		EDGEWOOD	VILLA 42	H9322430042	42	CRESTVIEW HILLS
H9322430044	VILLA	243	KENTON		EDGEWOOD	VILLA 44	H9322430044	44	EDGEWOOD
H40C0151524	WEST END	15	HAMILTON		CINCINNATI	WEST END 24	H40C0151524	24	COVINGTON
H9320590042	WILDER	59	KENTON		WILDER	WILDER 42	H9320590042	42	FT. THOMAS
H9320590043	WILDER	59	KENTON		WILDER	WILDER 43	H9320590043	43	COVINGTON
H9320590047	WILDER	59	KENTON		WILDER	WILDER 47	H9320590047	47	NEWPORT
H9320770041	YORK	77	CAMPBELL		NEWPORT	YORK 41	H9320770041	41	NEWPORT

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CIRCUIT ROAD	CIRCUIT GENERAL AREA	TOTAL CIRCUIT LENGTH (miles)	CUSTOMER COUNT FOR THIS CIRCUIT	DATE OF LAST CIRCUIT TRIM (VEGETATION MANAGEMENT)	CIRCUIT 5-YEAR AVERAGE (SAIDI)	REPORTING YEAR (2023) SAIDI	DID SAIDI INCREASE IN 2023?	CIRCUIT 5-YEAR AVERAGE (SAIFI)	REPORTING YEAR (2023) SAIFI	DID SAIFI INCREASE IN 2023?
	Covington	1.46	257	10/23/2023	4.464	68.677	YES	0.105	1.039	YES
	Covington	6.1	1,398	11/21/2020	37.913	65.955	YES	0.378	1.146	YES
	Covington	8.03	1,231	11/14/2020	41.374	139.886	YES	0.459	3.099	YES
	Covington	9.38	2,029	11/16/2023	22.458	76.773	YES	0.308	1.306	YES
	Bellevue	21.34	2,524	8/3/2020	61.891	81.076	YES	0.574	0.200	NO
	Cold Springs	42.56	1,911	11/18/2019	41.245	19.310	NO	0.202	0.258	YES
	Cold Springs, Brookstone Crossing	38.2	2,723	12/26/2019	57.338	176.965	YES	0.707	1.086	YES
	Taylorsport	12.77	130	5/22/2021	112.539	80.450	NO	0.838	1.766	YES
	Villa Hills	48.65	2,109	6/26/2021	110.158	193.542	YES	0.772	1.791	YES
	Covington	6.2	1,026	10/17/2023	30.536	54.915	YES	0.238	0.092	NO
	Covington	6.31	1,940	7/31/2023	62.536	561.077	YES	0.392	3.060	YES
	Ft. Mitchell	12.54	828	11/16/2019	72.126	320.550	YES	1.071	0.972	NO
	Ft. Mitchell	19.26	1,084	New Circuit in 2021	73.233	143.691	YES	0.526	0.709	YES
	Crittenden	39.88	1,670	7/6/2022	208.677	330.435	YES	1.039	1.458	YES
	Florence	5.78	623	6/12/2021	43.230	108.862	YES	0.379	0.381	YES
	Florence	1.77	28	4/24/2021	61.009	87.411	YES	0.424	1.034	YES
	Florence	3.42	39	5/1/2021	123.147	83.364	NO	0.313	0.667	YES
	Erlanger, Florence, CVG	12.01	690	11/19/2020	304.061	349.593	YES	1.931	1.020	NO
	Erlanger, Florence, CVG	0	921	2/27/2021	21.819	33.542	YES	0.224	0.462	YES
	Erlanger, Florence, CVG	4.6	13	5/24/2023	11.510	42.943	YES	0.056	0.234	YES
	Florence, Union	28.98	1,983	1/26/2019	61.006	50.602	NO	0.684	1.509	YES
	Florence	1.19	1	12/28/2023	96.950	29.350	NO	0.400	1.000	YES
	Florence	12.18	614	4/18/2020	28.987	116.523	YES	0.393	0.842	YES
	Florence	17.54	1,171	4/18/2020	58.504	82.463	YES	0.486	0.967	YES
	Taylor Mill	18.22	882	12/28/2023	120.433	31.344	NO	0.851	1.100	YES
	Petersburg	48.1	674	9/23/2019	91.162	384.141	YES	0.669	1.729	YES
	Ft. Wright, Ft. Mitchell	19.54	1,529	7/31/2023	73.246	92.126	YES	0.704	0.207	NO
	Taylor Mill	14.71	963	12/29/2022	175.196	372.448	YES	1.131	1.256	YES
	Northern Kentucky University	0.03	1	Nothing to trim	10.200	80.920	YES	0.200	1.000	YES
	Northern Kentucky University	14.98	1,829	9/25/2023	46.677	52.403	YES	0.499	0.333	NO
	Highland Heights	17.32	694	10/10/2019	83.691	387.124	YES	0.975	3.658	YES
	Highland Heights	0.78	1	Nothing to trim	0.000	66176.000	YES	0.000	752.000	YES
	Northern Kentucky University	1.33	4	1/4/2020	0.000	28952.000	YES	0.000	376.000	YES
	Hebron	27.35	1,104	3/9/2019	0.000	48.913	YES	0.000	0.969	YES
	Limaburg	40.45	1,827	8/19/2020	71.344	138.314	YES	0.795	2.485	YES
	Union and Beaverlick	44.48	1,288	New Circuit in 2022	63.618	34.781	NO	0.212	0.275	YES
	Highland Heights	19.76	2,258	10/24/2023	26.983	32.306	YES	0.293	0.142	NO
	Florence	1.58	12	9/16/2021	32.662	37.318	YES	0.279	0.167	NO
	Florence	3.5	60	8/10/2023	1.911	34.072	YES	0.009	0.466	YES
	Richwood	33.18	2,246	8/21/2023	79.787	210.593	YES	0.700	1.568	YES
	Verona, Piner, Fiskburg and Walton	20.67	375	4/10/2021	174.507	175.440	YES	1.291	5.326	YES
	Crittenden, Walton	22.64	824	12/29/2022	40.304	132.805	YES	0.544	0.937	YES
	Lakeside Park	14.58	1,699	10/16/2023	61.218	23.427	NO	0.165	0.189	YES
	Crestview Hills	12.88	894	11/11/2019	59.321	104.550	YES	0.532	0.340	NO
	Edgewood	25.18	1,959	12/8/2020	76.425	44.621	NO	0.354	0.383	YES
	Mutter Gottes	1.65	91	6/28/2022	1.680	260.222	YES	0.007	1.011	YES
	Ft. Thomas	14.72	1,724	8/8/2022	128.106	210.954	YES	0.564	1.062	YES
	Covington, Latonia	9.98	1,733	10/25/2022	141.758	34.171	NO	0.910	1.086	YES
	Southgate	13.64	1,880	10/18/2022	63.385	81.196	YES	0.449	1.379	YES
	Newport	7.7	1,566	11/6/2021	70.941	76.667	YES	0.865	1.028	YES

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SUBSTATION - CIRCUIT	CIRCUIT NAME	CIRCUIT ID	OUTAGE CAUSE	PERCENT OF TOTAL OUTAGE MINUTES	CORRECTIVE ACTION PLAN
AUGUSTINE - H9320780042	AUGUSTINE	H9320780042	11 Unknown Cause	98.90%	All of the Unknown Cause outage minutes were due to a sustained event that occurred inside the substation and caused the circuit breaker to lockout. All of the customers were restored through alternate sources until the issue was resolved. No further action is required.
			05 Planned (EEE)	1.10%	
				100.00%	
AUGUSTINE - H9320780043	AUGUSTINE	H9320780043	03 Vegetation	93.85%	All of the Vegetation outage minutes resulted from two events. One event occurred during an MED and the other was due to a live limb that broke during high winds falling across the conductors. No further action is required. This circuit is scheduled to be trimmed in 2024.
			EA Weather	4.70%	
			28 Other Cause	1.31%	
			20 Equipment failure	0.09%	
			04 Wildlife	0.05%	
				100.00%	
AUGUSTINE - H9320780044	AUGUSTINE	H9320780044	28 Other Cause	94.70%	The majority of the Other Cause outage minutes occurred during the switching of the circuit(s) that resulted in the load limit of the recloser being exceeded due to another event on the tie circuit. Once the load was shed, the recloser was closed back in. No further action is required.
			EA Weather	2.64%	
			20 Equipment failure	1.75%	
			05 Planned (EEE)	0.48%	
			03 Vegetation	0.42%	
				100.00%	
AUGUSTINE - H9320780045	AUGUSTINE	H9320780045	28 Other Cause	66.84%	The majority of the Other Cause outage minutes occurred due to a sustained fault on the 13KV Bus 2 resulting from a failed pothead termination on an underground cable run at the substation. All of the Vegetation outage minutes occurred due to trees on the wires and poles. This circuit was last trimmed in the last quarter of 2023. No further action is required.
			03 Vegetation	12.61%	
			09 Public Accident/Damage	8.46%	
			20 Equipment failure	5.23%	
			04 Wildlife	3.27%	
			05 Planned (EEE)	2.92%	
			11 Unknown Cause	0.61%	
EA Weather	0.05%				
				100.00%	
BELLEVUE - H9321310043	BELLEVUE	H9321310043	09 Public Accident/Damage	54.89%	The majority of the Public Accident/Damage outage minutes occurred due to a public vehicle hitting/breaking pole CAK-4524. The majority of the Vegetation outage minutes occurred due to a tree knocking a phase down on a rear property location during an MED. The majority of the Equipment Failure outage minutes occurred due to a couple of wires down during an MED that required grounding for safety. All damaged equipment was replaced at the time of restoration. No further action is required.
			03 Vegetation	23.20%	
			20 Equipment failure	19.62%	
			04 Wildlife	1.16%	
			EA Weather	0.73%	
			05 Planned (EEE)	0.25%	
			28 Other Cause	0.16%	
				100.00%	
COLD SPRING - H9321320041	COLD SPRING	H9321320041	EA Weather	82.94%	The majority of the Weather outage minutes occurred due to reclosers locking out during an MED. The majority of the Vegetation outage minutes occurred due to two events that were on the same day resulting from trees on the lines. All damaged equipment was replaced at the time of the restoration. This circuit is scheduled to be trimmed in 2024.
			03 Vegetation	13.03%	
			20 Equipment failure	3.29%	
			28 Other Cause	0.43%	
			19 Lightning strike	0.17%	
				100.00%	
COLD SPRING - H9321320042	COLD SPRING	H9321320042	20 Equipment failure	69.32%	The majority of the Equipment Failure outage minutes occurred due to one event that resulted from a failed pothead at the feeder ext. located on pole 39CA-817. The majority of the Vegetation outage minutes occurred due to one event that resulted from a dead tree limb on the lines during an MED. All damaged equipment was replaced at the time of the restoration. This circuit is scheduled to be trimmed in 2024.
			03 Vegetation	10.49%	
			28 Other Cause	9.43%	
			EA Weather	9.01%	
			11 Unknown Cause	1.31%	
			05 Planned (EEE)	0.42%	
			04 Wildlife	0.02%	
				100.00%	
CONSTANCE - H9320420041	CONSTANCE	H9320420041	20 Equipment failure	80.97%	The majority of the Equipment Failure outage minutes occurred due to a burnt bolted wedge connector at pole K101-59 that caused the B phase and multiphase customers on the circuit to drop load, affecting Constance 41 and 42. All damaged equipment was replaced at the time of the restoration. No further action is required.
			28 Other Cause	9.43%	
			04 Wildlife	4.95%	
			11 Unknown Cause	3.21%	
			19 Lightning strike	1.45%	
				100.00%	
CONSTANCE - H9320420042	CONSTANCE	H9320420042	20 Equipment failure	64.35%	The majority of the Equipment Failure outage minutes occurred due to a burnt bolted wedge connector at pole K101-59 that caused the B phase and multiphase customers on the circuit to drop load, affecting Constance 41 and 42. All damaged equipment was replaced at the time of the restoration. The majority of the Vegetation outage minutes occurred due to a dead tree falling on the lines causing a recloser to lock out. The majority of the Weather outage minutes occurred due to a defective underground cable and a failed cutout identified during the same event. All damaged equipment was replaced at the time of the restoration. This circuit was last trimmed in 2021 and the circuit is scheduled to be segmented and optimized in 2027. No further action is required.
			03 Vegetation	20.22%	
			EA Weather	12.62%	
			09 Public Accident/Damage	2.19%	
			19 Lightning strike	0.44%	
			28 Other Cause	0.10%	
			04 Wildlife	0.06%	
			05 Planned (EEE)	0.02%	
COVINGTON - H9322170041	COVINGTON	H9322170041	03 Vegetation	81.43%	The majority of the Vegetation outage minutes occurred due to two events involved trees on lines. All of the Weather outage minutes occurred due to one event resulting from a failed to ping meter that was out at the time due to possible high winds in the area. All damaged equipment was replaced at the time of the restoration. This circuit was last trimmed in the last quarter of 2023. No further action is required.
			EA Weather	10.32%	
			20 Equipment failure	4.14%	
			05 Planned (EEE)	3.54%	
			28 Other Cause	0.57%	
				100.00%	
COVINGTON - H9322170043	COVINGTON	H9322170043	20 Equipment failure	59.73%	The majority of the Equipment Failure outage minutes occurred due to two events. One event was due to a bad underground cable that had to be isolated in order to locate the cable, and the other event was due to a failed pothead. The majority of the Weather outage minutes occurred due to an unknown cause event, during high winds that caused the circuit breaker to lock out. All damaged equipment was replaced at the time of the restoration. This circuit was last trimmed in 2023. No further action is required.
			EA Weather	32.43%	
			11 Unknown Cause	5.41%	
			05 Planned (EEE)	1.73%	
			28 Other Cause	0.70%	
			03 Vegetation	0.00%	
				100.00%	
CRESCENT - H9320700042	CRESCENT	H9320700042	EA Weather	76.07%	The majority of the Weather outage minutes occurred due to a recloser locking out from a wire down at pole K70-772. The majority of the Vegetation outage minutes occurred due to two events. One event occurred in conjunction to the weather event due to a recloser locking out from a wire down at pole K70-772. The other event occurred later in the year due to a tree limb coming down onto the static line at pole K70-772. All damaged equipment was replaced at the time of the restoration. This circuit is scheduled to be trimmed in 2024.
			03 Vegetation	23.33%	
			28 Other Cause	0.56%	
			20 Equipment failure	0.04%	
				100.00%	
CRESCENT - H9320700046	CRESCENT	H9320700046	28 Other Cause	72.87%	All of the Other Cause outage minutes occurred due to one event involving trees falling onto the lines and breaking multiple poles during an MED. All damaged equipment was replaced at the time of the restoration. This circuit is scheduled to be trimmed in 2024.
			11 Unknown Cause	8.48%	
			03 Vegetation	8.10%	
			19 Lightning strike	5.19%	
			20 Equipment failure	4.95%	
			04 Wildlife	0.31%	
			09 Public Accident/Damage	0.07%	
EA Weather	0.03%				
				100.00%	

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CRITTENDEN - H9321240041	CRITTENDEN	H9321240041	09 Public Accident/Damage	60.26%	The majority of the Public Accident/Damage outage minutes were from two events. One event was caused due to a public vehicle hitting/breaking pole 5G-87 and the other event was caused by a dig in event that ripped out approximately 25 ft of conductor. All of the Weather outage minutes were from a transmission level event that effected multiple circuits during an MED. All of the Equipment Failure outage minutes were from two events. One event was caused by a failed trip saver and the other event was related to a public vehicle accident that caused the conductor to break. All damaged equipment was replaced at the time of restoration and the circuit is scheduled to be segmented and optimized in 2025. No further action is required.
			EA Weather	17.67%	
			20 Equipment failure	10.75%	
			03 Vegetation	4.71%	
			11 Unknown Cause	4.42%	
			19 Lightning strike	1.92%	
			05 Planned (EEEE)	0.23%	
			28 Other Cause	0.04%	
	100.00%				
DIXIE - H9320890041	DIXIE	H9320890041	20 Equipment failure	87.96%	The majority of the Equipment Failure outage minutes occurred due to two events resulting from a bad underground cables at different locations. All damaged equipment was replaced at the time of restoration. No further action is required.
			03 Vegetation	9.04%	
			28 Other Cause	2.18%	
			EA Weather	0.52%	
			05 Planned (EEEE)	0.22%	
			04 Wildlife	0.09%	
	100.00%				
DIXIE - H9320890043	DIXIE	H9320890043	20 Equipment failure	92.49%	All of the Equipment Failure outage minutes are due to one event resulting from a pole fire and the OCC opened the circuit for safety to replace the equipment at the time of the event. All damaged equipment was replaced at the time of restoration. No further action is required.
			04 Wildlife	4.04%	
			EA Weather	3.47%	
				100.00%	
DIXIE - H9320890045	DIXIE	H9320890045	EA Weather	83.95%	All of the Weather outage minutes were from two events that occurred due to reclosers locking out during MEDs. The majority of the Equipment Failure outage minutes were from one event due to a blown terminal fuse. All damaged equipment was replaced at the time of restoration. No further action is required.
			20 Equipment failure	14.87%	
			28 Other Cause	0.60%	
			19 Lightning strike	0.57%	
				100.00%	
DONALDSON - H9320550043	DONALDSON	H9320550043	09 Public Accident/Damage	97.13%	The majority of the Public Accident/Damage occurred due to a public vehicle (semi-truck) hitting/breaking pole 21BN-324 and attempting to back out causing the adjacent poles to break. There have been multiple semi-truck events on this section of the circuit in the past, and the county has installed "no-thru truck" signs at all entrances to this neighborhood. All damaged equipment was replaced at the time of restoration. No further action is required.
			05 Planned (EEEE)	1.78%	
			11 Unknown Cause	1.09%	
				100.00%	
DONALDSON - H9320550044	DONALDSON	H9320550044	20 Equipment failure	57.36%	The majority of the Equipment Failure outage minutes occurred due to a defective stirrup that resulted in a wire down at pole K104-573. All of the Planned outage minutes were to perform reconductor work. All damaged equipment was replaced at the time of restoration. No further action is required.
			05 Planned (EEEE)	31.16%	
			EA Weather	9.97%	
			04 Wildlife	1.50%	
				100.00%	
DONALDSON - H9320550047	DONALDSON	H9320550047	20 Equipment failure	100.00%	All of the Equipment Failure outage minutes occurred due to two events that only affected one customer. One outage was a 3 phase outage and the other was due to a defective ground kit on terminal pole BNK-5438. All damaged equipment was replaced at the time of restoration. No further action is required.
				100.00%	
EMPIRE - H9322890041	EMPIRE	H9322890041	41 Loss of transmns/generation	84.99%	The majority of the Loss of Transmission/Generation outage minutes occurred due to a sustained outage on circuit 6763 from a tree that fell from outside the right of way onto the line near pole 318N-397, effected multiple circuits. The majority of the Wildlife outage minutes occurred due to a squirrel making contact with transformer bank 1 at the substation. All damaged equipment was replaced at the time of restoration. No further action is required.
			04 Wildlife	11.01%	
			EA Weather	3.06%	
			03 Vegetation	0.56%	
			20 Equipment failure	0.23%	
			05 Planned (EEEE)	0.12%	
			11 Unknown Cause	0.02%	
				100.00%	
EMPIRE - H9322890042	EMPIRE	H9322890042	41 Loss of transmns/generation	100.00%	The majority of the Loss of Transmission/Generation outage minutes occurred due to a sustained outage on circuit 6763 from a tree that fell from outside the right of way onto the line near pole 318N-397, effected multiple circuits. All damaged equipment was replaced at the time of restoration. No further action is required.
				100.00%	
FLORENCE - H9322410042	FLORENCE	H9322410042	EA Weather	88.82%	All of the Weather outage minutes occurred due to the same event that resulted from trees on the lines during an MED. The majority of the Equipment Failure outage minutes occurred due to a wire down at an intersection. All damaged equipment was replaced at the time of the restoration. This circuit was last trimmed in 2020. No further action is required.
			20 Equipment failure	11.03%	
			04 Wildlife	0.08%	
			28 Other Cause	0.04%	
			05 Planned (EEEE)	0.02%	
			03 Vegetation	0.02%	
	100.00%				
FLORENCE - H9322410044	FLORENCE	H9322410044	20 Equipment failure	99.14%	The majority of the Equipment Failure outage minutes occurred due to a broken hand tie that allowed the conductor to fall off of the insulator onto the crossarm, resulting in a fire at pole BNK-5809. All damaged equipment was replaced at the time of the restoration. No further action is required.
			05 Planned (EEEE)	0.45%	
			28 Other Cause	0.38%	
			EA Weather	0.03%	
				100.00%	
HANDS - H9321280045	HANDS	H9321280045	03 Vegetation	95.73%	The majority of the Vegetation outage minutes occurred due to two events. One event occurred due to a tree on the lines at pole 11K-723. The other event occurred due to a live oak tree limb, located 15ft from centerline, breaking off of the tree and falling across the conductors at pole KNK-2806. All damaged equipment was replaced at the time of the restoration. This circuit was last trimmed in the last quarter of 2023. No further action is required.
			20 Equipment failure	2.16%	
			EA Weather	1.77%	
			04 Wildlife	0.34%	
				100.00%	
HEBRON - H9321520042	HEBRON	H9321520042	03 Vegetation	99.07%	The majority of the Vegetation outage minutes occurred due to a live locust tree limb, located 18ft from centerline, breaking off of the tree and falling across the conductors in-between poles 78N-39 & 78N-28 causing the circuit to lock out. This area has been identified as having overgrowth and vegetation management has performed a hazard tree assessment to identify hazard trees for additional trimming to be completed in 2024.
			20 Equipment failure	0.50%	
			04 Wildlife	0.21%	
			28 Other Cause	0.13%	
			EA Weather	0.07%	
			05 Planned (EEEE)	0.02%	
	100.00%				
KENTON - H932090041	KENTON	H932090041	20 Equipment failure	40.86%	The majority Equipment Failure outage minutes occurred due to pole K74-262 being damaged by water and requiring replacement. The majority of the Vegetation outage minutes occurred due to a tree breaking an overhead conductor. All damaged equipment was replaced at the time of the restoration. This circuit was last trimmed in 2023. No further action is required. The majority of the Weather outage minutes occurred due to a wire down and damaged cutouts during an MED. All damaged equipment was replaced at the time of the restoration. This circuit was last trimmed in the 3rd quarter of 2023. No further action is required.
			03 Vegetation	38.74%	
			EA Weather	17.60%	
			05 Planned (EEEE)	2.54%	
			28 Other Cause	0.25%	
				100.00%	
KENTON - H932090042	KENTON	H932090042	20 Equipment failure	82.11%	The majority Equipment Failure outage minutes occurred due to a burnt/exploved lightning arrester in the switchgear for Kenton 42 that caused the circuit lockout. The majority of the Vegetation outage minutes occurred due to a tree breaking an overhead conductor. All damaged equipment was replaced at the time of the restoration. This circuit was last trimmed in 2022. No further action is required.
			03 Vegetation	13.51%	
			05 Planned (EEEE)	4.29%	
			28 Other Cause	0.05%	
			04 Wildlife	0.04%	
	100.00%				
KY UNIV - H9322870041	KY UNIV	H9322870041	41 Loss of transmns/generation	100.00%	All of the Loss of Transmission/Generation outage minutes occurred due to a failed porcelain insulator on pole 35CA-1499. All damaged equipment was replaced at the time of the restoration. No further action is required.
				100.00%	
KY UNIV - H9322870042	KY UNIV	H9322870042	EA Weather	66.36%	The majority of the Weather outage minutes occurred due to a phase B to C fault that resulted in a recloser locking out during an MED. All of the Public Accident/Damage outage minutes occurred due to a public vehicle hitting/breaking poles CA17-19 and CA17-20. All damaged equipment was replaced at the time of the restoration. No further action is required.
			09 Public Accident/Damage	31.07%	
			20 Equipment failure	1.41%	
			05 Planned (EEEE)	0.96%	
			11 Unknown Cause	0.16%	
			19 Lightning strike	0.05%	
				100.00%	

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KY UNIV - H9322870043	KY UNIV	H9322870043	EA Weather	69.14%	The majority of the Weather outage minutes occurred due to two events. One event was due to a mid span fault at the flying tap in between poles 35CA-447 and 35CA-432 that caused circuit breaker 221 to lock out. The other event was due to a damaged pole, which resulted in a phase C to ground fault that locked out the circuit during an MED. The majority of the Vegetation outage minutes occurred due to damaged/rotten pole CAC-11266 that caused a recloser to lock out. All of the Loss of Transmission/Generation outage minutes occurred due to a failed porcelain insulator on pole 35CA-1499. All damaged equipment was replaced at the time of the restoration. This circuit is scheduled to be trimmed in 2024.
			03 Vegetation	10.86%	
			41 Loss of transmsn/generation	10.65%	
			28 Other Cause	8.05%	
			20 Equipment failure	1.08%	
			19 Lightning strike	0.21%	
			04 Wildlife	0.01%	
	100.00%				
KY UNIV - H9322870044	KY UNIV	H9322870044	41 Loss of transmsn/generation	100.00%	All of the Loss of Transmission/Generation outage minutes occurred due to a failed porcelain insulator on pole 35CA-1499. All damaged equipment was replaced at the time of the restoration. No further action is required.
				100.00%	
KY UNIV - H9322870045	KY UNIV	H9322870045	41 Loss of transmsn/generation	100.00%	All of the Loss of Transmission/Generation outage minutes occurred due to a failed porcelain insulator on pole 35CA-1499. All damaged equipment was replaced at the time of the restoration. No further action is required.
				100.00%	
LIMABURG - H9321890041	LIMABURG	H9321890041	09 Public Accident/Damage	92.41%	All of the Public Accident/Damage outage minutes occurred due to a public vehicle hitting/breaking a pole 19BN-136. All damaged equipment was replaced at the time of the restoration. No further action is required.
			EA Weather	6.84%	
			20 Equipment failure	0.67%	
			04 Wildlife	0.08%	
				100.00%	
LIMABURG - H9321890042	LIMABURG	H9321890042	28 Other Cause	68.40%	The majority of the Other Cause outage minutes occurred due to three separate events that happened while a hotline tag was in place to perform reconductor work, causing the same recloser to lock out in one shot during each event. Following these events, a broken porcelain fuse holder was identified at pole 20BN-1211. The majority of the Vegetation outage minutes occurred due to a large tree falling on the lines near pole 11BN-284. All damaged equipment was replaced at the time of the restoration. This circuit was last trimmed in 2020. No further action is required.
			03 Vegetation	25.48%	
			05 Planned (EEEE)	4.49%	
			EA Weather	0.82%	
			20 Equipment failure	0.66%	
			19 Lightning strike	0.15%	
				100.00%	
LONGBRANCH - H9320980044	LONGBRANCH	H9320980044	09 Public Accident/Damage	84.93%	All of the Public Accident/Damage outage minutes occurred due to a public vehicle hitting/breaking a pole 45BN-283 at 11367 US 42. All damaged equipment was replaced at the time of the restoration. No further action is required.
			19 Lightning strike	8.74%	
			EA Weather	4.30%	
			03 Vegetation	1.19%	
			28 Other Cause	0.42%	
			04 Wildlife	0.29%	
			05 Planned (EEEE)	0.13%	
				100.00%	
MARSHALL - H9323580041	MASHALL	H9323580041	11 Unknown Cause	44.85%	The majority of the Unknown Cause outage minutes occurred due to a possible issue with a cold load pickup while restoring the circuit. All of the Weather outage minutes occurred due to two events. One event was due to a damaged overhead conductor and the other due to a damaged neutral at a pole during an MED. All of the Public Accident/Damage outage minutes occurred due to a public vehicle (a concrete truck) that snagged the communication wires and caused the phases to get together. All damaged equipment was replaced at the time of the restoration and the circuit is scheduled to be segmented and optimized in 2025. No further action is required.
			EA Weather	24.40%	
			09 Public Accident/Damage	21.01%	
			05 Planned (EEEE)	5.02%	
			04 Wildlife	2.19%	
			28 Other Cause	1.39%	
			20 Equipment failure	1.08%	
				100.00%	
MT ZION - H9323050042	MT ZION	H9323050042	20 Equipment failure	54.18%	All of the Equipment Failure outage minutes occurred due to a line down pole to pole that effected one customer. All of the Weather outage minutes occurred due to a partial circuit outage that effected one customer. All damaged equipment was replaced at the time of the restoration. No further action is required.
			EA Weather	45.82%	
				100.00%	
MT ZION - H9323050044	MT ZION	H9323050044	41 Loss of transmsn/generation	99.88%	All of the Loss of Transmission/Generation outage minutes occurred due to a tree falling onto the transmission and distribution circuits, near pole 31BN-397, from outside of the right of way during an MED. All damaged equipment was replaced at the time of the restoration. No further action is required.
			28 Other Cause	0.09%	
			EA Weather	0.01%	
			20 Equipment failure	0.01%	
				100.00%	
RICHWOOD - H9321990042	RICHWOOD	H9321990042	03 Vegetation	50.05%	The majority of the Vegetation outage minutes occurred due to two events. One event resulted from a large live oak tree falling from 15ft from centerline, onto the conductors in between poles 36BN-39 and 36BN-38 causing the sectionalizer to lock out. The other event occurred due to vegetation on a overhead conductor during an MED. The majority of the Public Accident/Damage outage minutes occurred due to a public vehicle hitting/breaking pole 36BN-322 causing the phases to get together locking out the sectionalizer. The majority of the Equipment Failure outage minutes occurred due to two events. One event occurred due to a damaged/broken pole 36BN-322 and the other event resulted from a bad stretch of underground cable. All of the Weather outage minutes occurred due to two events during the same MED. All damaged equipment was replaced at the time of the restoration. This circuit was last trimmed in 2023. No further action is required.
			09 Public Accident/Damage	21.88%	
			20 Equipment failure	16.44%	
			EA Weather	11.28%	
			05 Planned (EEEE)	0.21%	
			28 Other Cause	0.12%	
			04 Wildlife	0.02%	
				100.00%	
VERONA - H9321250041	VERONA	H9321250041	20 Equipment failure	50.89%	The majority of the Equipment Failure outage minutes occurred due to a failed hand tie at pole 5G-322 that allowed the conductor to lay on the crossarm, tracking to the ground and causing a recloser to lock out. All of the Loss of Transmission/Generation outage minutes occurred due to a tree from outside the right of way falling onto circuit 6763, near pole 31BN-397. All damaged equipment was replaced at the time of the restoration. No further action is required.
			41 Loss of transmsn/generation	46.12%	
			05 Planned (EEEE)	2.19%	
			09 Public Accident/Damage	0.34%	
			19 Lightning strike	0.21%	
			04 Wildlife	0.16%	
			03 Vegetation	0.09%	
				100.00%	
VERONA - H9321250043	VERONA	H9321250043	09 Public Accident/Damage	59.97%	The majority of the Public Accident/Damage outage minutes occurred due to a public vehicle hitting and breaking pole 33K-53 at the base. The majority of the Weather outage minutes occurred due to a faulty recloser. All damaged equipment was replaced at the time of the restoration. No further action is required.
			EA Weather	37.13%	
			05 Planned (EEEE)	0.96%	
			20 Equipment failure	0.75%	
			11 Unknown Cause	0.62%	
			03 Vegetation	0.57%	
				100.00%	
VILLA - H9322430041	VILLA	H9322430041	EA Weather	76.17%	All of the Weather outage minutes occurred due to a tree on the line during an MED. The majority of the Equipment Failure outage minutes occurred due to two events. One event was due to a faulty meter and the other was due to a faulty transformer. All damaged equipment was replaced at the time of the restoration. No further action is required.
			20 Equipment failure	12.20%	
			03 Vegetation	9.33%	
			05 Planned (EEEE)	2.19%	
			04 Wildlife	0.11%	
				100.00%	
VILLA - H9322430042	VILLA	H9322430042	20 Equipment failure	70.35%	The majority of the Equipment Failure outage minutes occurred due to two events. One event was caused by a failed underground elbow and the other event was due to a defective underground cable. The majority of the Wildlife outage minutes occurred due to an unknown event by an animal. All damaged equipment was replaced at the time of the restoration. No further action is required.
			04 Wildlife	14.24%	
			28 Other Cause	9.25%	
			09 Public Accident/Damage	6.16%	
				100.00%	
VILLA - H9322430044	VILLA	H9322430044	03 Vegetation	42.92%	The majority of the Vegetation outage minutes occurred due to a tree on the line at pole K97-89. The majority of the Unknown Cause outage minutes occurred due to a damaged overhead conductor during an MED. All damaged equipment was replaced at the time of the restoration. This circuit was last trimmed in 2020 and the circuit is scheduled to be segmented and optimized in 2025. No further action is required.
			11 Unknown Cause	38.71%	
			04 Wildlife	6.10%	
			20 Equipment failure	4.75%	
			09 Public Accident/Damage	3.69%	
			19 Lightning strike	2.14%	
			05 Planned (EEEE)	1.35%	
			EA Weather	0.21%	
			28 Other Cause	0.09%	
				100.00%	

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WEST END STA - H40C0151524	WEST END STA	H40C0151524	EA Weather	89.74%	All of the Weather and Unknown Cause outage minutes occurred due to the same event. The event was caused by two copper bars at a disconnect in which opposite phases welded together. All damaged equipment was replaced at the time of restoration. No further action is required.
			11 Unknown Cause	10.26%	
				100.00%	
WILDER - H9320590042	WILDER	H9320590042	09 Public Accident/Damage	88.64%	All of the Public Accident/Damage outage minutes occurred due to a public vehicle hitting/breaking pole CA13-380, which caused pole CA13-314 to break and the phases to get together locking out the circuit breaker. All damaged equipment was replaced at the time of restoration. No further action is required.
			03 Vegetation	7.58%	
			20 Equipment failure	3.58%	
			05 Planned (EEEE)	0.16%	
			28 Other Cause	0.04%	
				100.00%	
WILDER - H9320590043	WILDER	H9320590043	09 Public Accident/Damage	97.10%	The majority of the Public Accident/Damage outage minutes occurred due to two events. One event occurred due to a public vehicle hitting/breaking a guy wire at pole CA9-16 knocking it into the primary conductor causing the circuit breaker to lock out. The other event occurred due to a public vehicle hitting/damaging a pole. All damaged equipment was replaced at the time of restoration. No further action is required.
			04 Wildlife	1.37%	
			20 Equipment failure	1.12%	
			05 Planned (EEEE)	0.41%	
				100.00%	
WILDER - H9320590047	WILDER	H9320590047	20 Equipment failure	78.44%	The majority of the Equipment Failure outage minutes occurred due to the phases getting together during high winds in between poles CA10-760 and CA10-741. Repairs are planned to be completed in 2024. The majority of the Public Accident/Damage outage minutes occurred due to a public vehicle hitting/breaking pole CA10-252. All damaged equipment was replaced at the time of restoration. No further action is required.
			09 Public Accident/Damage	16.86%	
			05 Planned (EEEE)	2.19%	
			EA Weather	1.79%	
			28 Other Cause	0.44%	
			04 Wildlife	0.21%	
				100.00%	
YORK - H9320770041	YORK	H9320770041	20 Equipment failure	93.40%	The majority of the Equipment Failure outage minutes occurred due to the DCC opening the circuit breaker to make repairs to a broken hand tie on pole CA9-664. All damaged equipment was replaced at the time of restoration. No further action is required.
			04 Wildlife	5.13%	
			05 Planned (EEEE)	1.46%	
				100.00%	

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SECTION 1- GOAL, OBJECTIVES, AND PURPOSE

Duke Energy Kentucky’s vegetation management goal is to balance the need for reliable electrical service with cost-effective vegetation management practices.

The primary objective of the Duke Energy Kentucky Vegetation Management Program is to control the growth of incompatible vegetation along its electric infrastructure to provide reliable service to our customers. This is accomplished by using qualified personnel to monitor the condition of the utility rights-of-way and by initiating various vegetation management practices to reduce or eliminate incompatible growth. This integrated vegetation management program is essential to providing reliable electric service by ensuring that trees, brush and vines near or within rights-of-way are periodically pruned or taken down to help reduce outages and risks near the company’s facilities.

The consistent implementation of industry accepted vegetation management practices reduces the likelihood of tree and power line conflicts, as well as service interruptions, and allows for the full utilization of the operating system.



SECTION 2 – DEFINITIONS

ANSI A300 - American National Standards Institute (ANSI) A300 for Tree Care Operations provides the generally accepted industry performance standards for the care and management of trees, shrubs, and other woody plants.

ANSI Z133 - American National Standards Institute (ANSI) Z133 for Arboricultural Operations provides the generally accepted industry safety standards for the care and management of trees, shrubs, and other woody plants.

BRUSH - A perennial woody stem less than six inches DBH (diameter at breast height).

CIRCUIT MILES - (for reference and reporting purposes) The distance, in miles, of primary voltage electric lines from the substation to the end of the circuit including single phase, two phase or three phase configurations. The distance is measured to the nearest 1/10th of a mile.

COMPATIBLE VEGETATION – Vegetation within the distribution right of way that does not present a grow-in or fall-in threat that has a typical mature height of less than 15 feet and whose trunk is typically no closer than 20 feet from the center of the right of way.

CONTRACTOR - Corporation to whom the vegetation management work is awarded.

DANGER TREE – A traditional industry term for a tree that if it were to fall or be cut would be tall enough to strike electrical lines and equipment of the distribution system.

HAZARD TREE - A traditional industry term for a tree that is dead, structurally unsound, diseased, shallow-rooted, leaning or otherwise defective that could strike electrical lines or equipment of the distribution system if it falls or is cut.

INCOMPATIBLE VEGETATION – Vegetation within or outside the distribution right of way that will mature to a height or size that will pose a grow-in, fall-in, or blowing-together threat to the distribution conductor, or that will limit or block access to distribution facilities during routine or emergency maintenance activity.

INTEGRATED VEGETATION MANAGEMENT - Vegetation plan that combines various components including pruning, mowing, removals, and herbicide applications to manage the growth of vegetation on the electric utility rights-of-way.

LEGAL- Duke Energy Legal Department.

MAINTAINED/LANDSCAPED AREAS - An area where cut brush typically cannot be left on-site. Maintained areas typically include maintained yards and landscaped areas.

NON-MAINTAINED/NON-LANDSCAPED AREAS - An area where cut brush can be left on-site. Non-Maintained areas are unimproved areas or natural areas.

OPEN WIRE SECONDARY (OWS): A distribution line configuration that uses 2, 3 or 4 un-insulated conductors stacked vertically with 12 inches spacing between conductors, used to deliver secondary voltages ranging from 120-600 volts to the customer.



SECTION 2 – DEFINITIONS CONTINUED

PRIMARY LINE: Electric conductor(s) energized at greater than 600 volts of electricity.

RIGHT-OF-WAY (ROW)- A strip of land that an electric utility uses to construct, operate, inspect, maintain, repair, or replace an overhead or underground power line. The ROW allows the utility to provide clearance from trees, buildings and other structures that could interfere with the line installation, maintenance, and operation. ROW may include licenses, easements, and other rights to access property.

SECONDARY LINE: Electric conductor(s) are energized at 600 volts or less of electricity.

SERVICE – TRIPLEX – MULTIPLEX CABLE: Electric conductor(s) energized at 600 volts or less of electricity and terminate at a service delivery point. A bundle of three or four conductors, most commonly used to provide aerial service to homes and businesses, denoted by its 3 or 4 polyethylene coated conductors wrapped around a bare, aluminum conductor.

SINGLE PHASE PRIMARY: A type of electric power line construction that contains one (1) conductor energized at primary voltage.

THREE PHASE PRIMARY: A type of electric power line construction that contains three (3) conductors energized at primary voltage.

TREE- A perennial woody stem equal or greater than six inches in DBH (diameter at breast height)

TWO PHASE OR OPEN WYE: A type of electric power line construction that contains two (2) conductors energized at primary voltage.

UNIT MILE: A mile within a circuit that is required to be or has been trimmed per contract specifications.



SECTION 3 – FEDERAL, STATE, AND LOCAL LAWS

Contractor shall perform all work in conformance with Duke Energy Kentucky Vegetation Management Program requirements and work specifications, Occupational Health and Safety Administration (OSHA) regulations, American National Standards Institute (ANSI) A300 and Z133 standards as amended, and all federal, state, county, and municipal laws, ordinances, and regulations applicable to said work.

The governing entities include but are not limited to:

- Kentucky Public Services Commission (Commission)
- Kentucky Transportation Cabinet (Department of Transportation)
- Kentucky Department of Agriculture
- Occupational Health and Safety Administration (OSHA)
- American National Standards Institute (ANSI)
- Easement and/or Permit Documents



SECTION 4 – PROPERTY ACCESS RIGHTS / REQUIREMENTS

The rights to access, assess, inspect, or perform the work associated with vegetation management practices include, but are not limited to, established legal instruments, easements, public road rights-of-way, municipal ordinances, state statutes, regulatory rules, tariffs, and other legal authority. Personnel responsible for implementing vegetation management on behalf of Duke Energy Kentucky should, when necessary, utilize the available supporting documents to pursue the completion of necessary work activities to maintain vegetation growth to the established standards of acceptance in the provision of safe and reliable electric service. If there are objections, restrictions or limitations that prevent completion of the necessary work activities, personnel should contact the Land Services Department or Legal Department for specialized assistance.

A list of items to determine property access rights include, but are not limited to:

- Existing property easement, prescriptive easements, public road rights of way and / or agreements
- State statutes
- Municipal codes
- Commission rules, regulations, orders, and approved tariffs.



SECTION 5 – WORK QUALITY AND SAFETY STANDARDS

All work shall be performed in conformance with the governing rules from the following: Duke Energy Kentucky Vegetation Management Program Requirements, OSHA regulations, National Electrical Safety Code (NESC), ANSI A300 Z133 Standards as amended and all federal, state, county, and municipal laws, statutes, ordinances, and regulations applicable to said work.

Clearance to obtain safety and reliable electric service are based on, but not limited to, consideration of the following: NESC

ANSI A300 Standard - American National Standards Institute A300 for Tree Care Operations For utility line clearance work, the primary foci are Parts Clauses 5, 11, and 13.

ANSI Z133 Standard - American National Standards Institute Z133 for Tree Care Operations - Safety Requirements

OSHA Standard 29 Code of Federal Regulations (CFR) 1910.269 - OSHA Standard 29 CFR 1910.269 (a)(1)(i)(E) for Electric Power Generation, Transmission, and Distribution

Pruning Trees Near Electrical Utility Lines – A Field Pocket Guide for Qualified Line-Clearance Tree Workers by Dr. Alex L. Shigo



SECTION 6 – DISTRIBUTION VEGETATION MANAGEMENT OVERVIEW FOR PLANNED WORK

Based on a data driven approach to facilitate a 5-year trim cycle, Duke Energy Kentucky will review, and clear vegetation as needed from approximately 20% of distribution system miles annually. Vegetation maintenance may include tree pruning, mechanical limb removal, brush cutting/mastication, herbicide application and tree removal. The primary objective of the Duke Energy Kentucky Vegetation Management Program is to control the growth of incompatible vegetation and remove hazard trees along its electric lines to help provide reliable service to our customers by limiting or eliminating the possibility of contact by vegetation which has grown towards or could fall into the overhead distribution lines. This is accomplished by using qualified personnel to monitor the condition of the utility rights-of-way and by initiating various vegetation control practices to reduce, manage or eliminate incompatible growth.

The consistent implementation of industry accepted vegetation management practices reduces the likelihood of tree and power line conflicts, as well as service interruptions, and allows for the full utilization of the operating system.

Distribution Line Clearances

Trees located along the right-of-way edge will, in most cases, encroach upon the electrical conductors through the side growth of their limbs. The maintenance of these trees requires the removal or partial removal of those potentially interfering limbs. Industry standards dictate the methods of pruning such limbs to minimize any damages to the tree. Incompatible brush within the distribution right-of-way corridors is eliminated if possible. When such vegetation is eliminated, it will normally be cut down by manual or mechanical means.

- Primary distribution lines are typically cleared during routine pruning to obtain no less than ten feet of side clearance. Unsuitable branches which are dead, dying, diseased or structurally unsound and above distribution facilities are removed during pruning.
- Secondary, including open wire secondary distribution conductors (without a primary distribution line and excluding a service drop), are pruned on an as needed basis.
- Multiplex cables and guy wires (without a primary distribution line and excluding a service drop), are trimmed on an as needed basis. Removal of load bearing limbs that are in contact with conductors and have a size and weight that causes tension on the conductor or interference with the normal sag or alignment of the conductor will be pruned for a minimum of 12 inches of clearance.
- Duke Energy Kentucky shall have no responsibility to clear vegetation from a service drop.

Hazard Tree Mitigation

Trees found within or adjacent to the right-of way that are dead, structurally unsound, diseased, shallow-rooted, leaning or otherwise defective that pose unacceptable risks to electrical infrastructure are targeted to be taken down. Stumps from trees (live) taken down shall be treated with herbicides where appropriate.



SECTION 7 – INSPECTIONS AND MONITORING

Duke Energy Kentucky can and may perform inspections and assessments of distribution circuits to observe vegetation conditions on the distribution system. The intent of these inspections is to identify off-cycle vegetation threats along the distribution line corridors and take appropriate action.



**Transmission Vegetation Management Program –
Duke Energy Kentucky, Inc.**



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SECTION 1 – GOALS, OBJECTIVES AND PURPOSE

Duke Energy Kentucky’s vegetation management goal is to balance the need for reliable utility service with cost-effective vegetation management practices.

The primary objective of the Duke Energy Kentucky Vegetation Management Program is to control the growth of incompatible vegetation along its electric facilities to help provide reliable service to our customers. This is accomplished by using qualified personnel to monitor the condition of the utility rights-of-way and by initiating various vegetation control practices to reduce, manage or eliminate incompatible growth. This integrated vegetation management program is essential in providing reliable electric service by ensuring that trees and brush near or within rights-of-way are periodically trimmed or taken down to help reduce potential outages and hazards near our facilities.

The consistent implementation of industry accepted vegetation management practices reduces the likelihood of tree and power line conflicts, as well as service interruptions, and allows for the full utilization of the operating system.



SECTION 2 – DEFINITIONS

ANSI A300 - American National Standards Institute (ANSI) A300 for Tree Care Operations, provides the generally accepted industry performance standards for the care and management of trees, shrubs, and other woody plants.

ANSI Z133 - American National Standards Institute (ANSI) Z133 for Arboricultural Operations, provides the generally accepted industry safety standards for the care and management of trees, shrubs, and other woody plants.

ASSET PROTECTION - Duke Energy department that enforces transmission right of way legal rights. BRUSH - A perennial woody stem less than six inches DBH (diameter at breast height).

COMPATIBLE VEGETATION – Vegetation within the Transmission Right of Way that will not mature to a height or size that will pose a grow-in, fall-in, or blowing-together threat to the transmission conductor, or that will not limit or block access, or the safe and reliable operation, emergency restoration, or maintenance activity, which is typically within 25 feet of any Duke Energy facilities (towers, poles, guy wires, guy anchors, etc.).

CONTRACTOR - Corporation to whom the Vegetation Management work is awarded.

CONDUCTOR BLOWOUT – Conductors horizontal position/location at National Electrical Safety Code (NESC) designed wind and temperature.

CONDUCTOR SAG – Conductors vertical position/location at designed maximum operating conditions.

DANGER TREE – A traditional industry term for a tree that if it were to fall or be cut would be tall enough to strike electrical lines and equipment of the transmission or distribution system.

HAZARD TREE - A traditional industry term for a tree that is dead, structurally unsound, diseased, shallow-rooted, leaning or otherwise defective that could strike electrical lines or equipment of the transmission system if it falls or is cut.

INCOMPATIBLE VEGETATION – Vegetation within or outside the Transmission Right of Way that will mature to a height or size that will pose a grow-in, fall-in, or blowing-together threat to the transmission conductor, or that will limit or block access, or the safe and reliable operation, emergency restoration, or maintenance activity, which is typically within 25 feet of any Duke Energy facilities (towers, poles, guy wires, guy anchors, etc.).

INTEGRATED VEGETATION MANAGEMENT - Vegetation plan that combines various components including pruning, mowing, removals, and herbicide applications to manage the growth of vegetation on the electric utility rights-of-way.

LEGAL- Duke Energy Legal Department.

MAINTAINED/LANDSCAPED AREAS - An area where cut brush typically cannot be left on-site. Maintained areas typically include maintained yards and landscaped areas.



NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION (NERC) CIRCUITS – Transmission lines typically operated at more than 200 kV. Some transmission lines operated at voltages lower than 200 kV may be designated as NERC circuits if deemed critical.



SECTION 2 – DEFINITIONS CONTINUED

NON-NERC CIRCUITS – Transmission lines that typically operate at less than 200 kV.

NON-MAINTAINED/NON-LANDSCAPED AREAS - An area where cut brush can be left on-site. Non-Maintained areas are unimproved areas or natural areas.

RECLAMATION – The establishment or reestablishment of Integrated Vegetation Management (IVM) objectives in areas not actively maintained.

RIGHT-OF-WAY (ROW)- A strip of land that an electric utility uses to construct, operate, inspect, maintain, repair, or replace an overhead or underground power line. The ROW allows the utility to provide clearance from trees, buildings and other structures that could interfere with line installation, maintenance, and operation. ROW may include licenses, easements, and other rights to access property.

TRANSMISSION LINE– A set of electrical conductors that carry 69 kV or more of electricity.

TREE- A perennial woody stem equal or greater than six inches in DBH (diameter at breast height)

SECTION 3 – FEDERAL, STATE, AND LOCAL LAWS

Contractor shall perform all work in conformance with the Duke Energy Kentucky Vegetation Management Program requirements and work specifications, Occupational Health and Safety Administration (OSHA) regulations, American National Standards Institute (ANSI) A300 and Z133 as amended, and all federal, state, county, and municipal laws, ordinances, and regulations applicable to said work.

The governing entities include but are not limited to:

- Kentucky Public Service Commission (Commission)
- Kentucky Transportation Cabinet (Department of Transportation)
- Kentucky Department of Agriculture
- Occupational Health and Safety Administration (OSHA)
- American National Standards Institute (ANSI)
- Easement and/or Permit Documents



SECTION 4 – PROPERTY ACCESS RIGHTS / REQUIREMENTS

The rights to access, assess, inspect, or perform the work associated with vegetation management practices include, but are not limited to, established legal instruments, easements, public road rights-of-way, municipal ordinances, state statutes, regulatory rules, tariffs, and other legal authority. Personnel responsible for implementing vegetation management on behalf of Duke Energy Kentucky should, when necessary, utilize the available supporting documents to pursue the completion of necessary work activities to maintain vegetation growth to the established standards of acceptance in the provision of reliable electric service. If there are objections, restrictions or limitations that prevent completion of the necessary work activities, Duke Energy Vegetation Management should contact the Land Services Department or Legal Department for specialized assistance.

A list of items to determine property access rights include, but are not limited to:

- Existing property easement, prescriptive easements, public road rights of way and / or agreements
- State statutes
- Municipal codes
- Commission rules, regulations, orders, and approved tariffs.



SECTION 5 – WORK QUALITY AND SAFETY STANDARDS

All work shall be performed in conformance with the governing rules from the following: Duke Energy Kentucky Vegetation Management Program Requirements, OSHA regulations, NESC and all federal, state, county, and municipal laws, statutes, ordinances, and regulations applicable to said work.

Clearance to obtain safety and reliable electric service are based on, but not limited to, consideration of the following:

National Electrical Safety Code (NESC)

ANSI A300 Standard - American National Standards Institute A300 for Tree Care Operations

- For utility line clearance work, the primary foci are Clauses 5, 11, and 13.

ANSI Z133 Standard - American National Standards Institute Z133 for Tree Care Operations - Safety Requirements

OSHA Standard 29 Code of Federal Regulations (CFR) 1910.269 -OSHA Standard 29 CFR 1910.269 (a)(1)(i)(E) for Electric Power Generation, Transmission, and Distribution

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SECTION 6 – TRANSMISSION VEGETATION MANAGEMENT OVERVIEW FOR PLANNED WORK

Duke Energy’s program is designed on an Integrated Vegetation Management (IVM) strategy that targets removals of incompatible vegetation to minimize potential outages to the Transmission system and ensure necessary access within all transmission line corridors. The reason for IVM is to create, promote, and conserve sustainable plant communities that are compatible with the intended use of the site, and manage incompatible plants that may conflict with the intended use of the site. This approach is recognized as an industry best management practice and is in alignment with ANSI A300 Part 7 standard.

As part of an IVM strategy, Duke Energy utilizes a threat and condition-based approach to planned work. This approach of identifying threats as triggers to determine incompatible vegetation within and outside the Transmission Right of Way. Duke Energy utilizes a process to define compatible and incompatible vegetation to balance the needs of public and worker safety as well as the reliable operation of the Transmission system. A time-based herbicide program will be used to further manage the ROW of incompatible vegetation and support IVM.

THREAT/CONDITION-BASED TRIGGERS

For planned work, threat trigger distances are used to identify vegetation threats that do not allow for safe operation of the transmission facilities, under all operating conditions (designed blowout and designed maximum operating sag). These threat triggers are radial distances based on engineering design criteria for the conductor sag and blowout operating locations and are voltage dependent.

These threat trigger distances provide for approximately 6 years of typical vegetation re-growth and supports minimum safe worker distances. Once vegetation has been identified as a threat, the vegetation will be evaluated to determine a mitigation strategy through the work planning process.

THREAT/CONDITION-BASED ACTION

During the work planning and marking process, many factors and criteria must be considered when developing the mitigation strategy. A Duke Energy Kentucky utility vegetation management professional will evaluate the vegetation based on arboricultural, regulatory/safety standards, legal ROW rights and criteria such as size, age, location, growth rate, maintained/landscaped vs. non- maintained/non-landscaped, etc. Property owner concerns with the proposed mitigation strategy shall be communicated to Duke Energy Kentucky personnel and alternative mitigation strategies will be considered. One mitigation strategy includes herbicide application.



MITIGATION FOR INCOMPATIBLE VEGETATION THREATS

All identified incompatible vegetation will be evaluated and taken down.

SPECIAL/SPECIFIC SITUATIONS

Potential Outage Risk: When a Transmission outage risk is identified, Duke Energy Kentucky will attempt to notify the affected property owner if practical and possible. However, Duke Energy Kentucky may need to take immediate action, such as taking down the vegetation, to protect the reliability and security of the Transmission system.

Roadside: For situations such as roadside, overhead Transmission lines built within public road right of way with limited Transmission Right of Way rights, a Wire Zone / Border Zone approach will be utilized with property owners to manage vegetation threats within and outside of the public road right of way.

Off ROW Danger Tree: Duke Energy Kentucky personnel will focus on taking down danger tree threats for reliability and storm hardening purposes on narrow corridors or rural areas where rights outside of the easement allow.

Storm: During storm events, debris in maintained or landscaped areas associated with emergency operations restoration efforts will be left on site and is the responsibility of the property owner.



SECTION 7 – INSPECTION AND MONITORING

Duke Energy Kentucky can and may perform inspections on each transmission circuit (69kv and above) to observe vegetation conditions on the transmission system. The intent of these inspections is to identify off-cycle vegetation threats along the transmission line corridors and take appropriate action.



SECTION 8 – VEGETATION CONTROL METHODS

TREE PRUNING - Trees found within or adjacent to the right-of-way edge will, in most cases, encroach upon the electrical conductors through the growth of their limbs. The management of these trees requires the removal or partial removal of those potentially interfering limbs. Industry standards dictate the proper methods of “pruning” such limbs to minimize any damages to the tree. These methods are in alignment with industry standards which refer to natural pruning, drop crotch and lateral pruning techniques. Stubbing and tearing of bark shall be avoided. When utilizing boom mounted cutting devices or helicopters to perform the pruning activities in rural locations, proper pruning methods are not typically a viable option.

HAZARD TREE MITIGATION - Trees found within or adjacent to the right-of way that are dead, structurally unsound, diseased, shallow-rooted, leaning or otherwise defective that could strike electrical lines or equipment are targeted to be taken down. Stumps from downed trees shall be treated with herbicides where appropriate and possible.

INCOMPATIBLE VEGETATION MITIGATION (i.e., trees) - Trees which are in close proximity to electrical facilities can require extensive pruning to prevent them from causing reliability or safety risk. These trees within the right-of-way will be targeted to be taken down and Duke Energy Kentucky will attempt to notify the affected property owner.

BRUSH MANAGEMENT - Because of a variety of terrain, differences in soil, land use, and vegetation types, Duke Energy Kentucky uses IVM practices which include environmentally acceptable herbicides to control brush within the right-of-way. All herbicides used in brush management operations shall be registered with the EPA and the applicable regulating state authority. In situations where brush height is of significant size and therefore not conducive to herbicide applications, the right of way may be mechanically mowed. In landscaped/maintained areas, brush will typically be hand cut and the remaining stumps treated.



SECTION 9 – CONTRACTOR RESPONSIBILITIES

STANDARDS TO FOLLOW - Contractor shall perform all work in conformance with Duke Energy Kentucky Vegetation Management Program requirements (Contract Terms and Conditions).