Shelby Energy Cooperative

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PUBLIC SERVICE COMMISSION

March 29, 2012

Director of Engineering
Public Service Commission
P.O. Box 615
Frankfort, KY 40602-0615

RE: Administrative Case No. 2006-0494

Enclosed are the original and ten (10) copies of the 2009 Distribution Reliability Report for Shelby Energy Cooperative as requested in the above order dated October 26, 2007.

Should you have any questions or need further information, please feel free to contact us.

Sincerely,

Jason Ginn
V.P. of Operations & Engineering

Enclosure

KENTUCKY PUBLIC SERVICE COMMISSION

Electric Distribution Utility Annual Reliability Report

SECTION 1: CONTACT INFORMATION

UTILITY NAME	1.1	Shelby Energy Cooperative
REPORT PREPARED BY	1.2	Distribution System Solutions, Inc.
E-MAIL ADDRESS OF PREPARER	1.3	jtaylor.dss@fuse.net
PHONE NUMBER OF PREPARER	1.4	859-363-7983

SECTION 2: REPORT YEAR

CALENDAR YEAR OF REPORT	2.1	2011

SECTION 3: MAJOR EVENT DAYS

T_{MED}	3.1	11.8
FIRST DATE USED TO DETERMINE T_{MED}	3.2	1-Jan-06
LAST DATE USED TO DETERMINE T_{MED}	3.3	31-Dec-10
NUMBER OF MED IN REPORT YEAR	3.4	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 RESULTS

Excluding MED

SAIDI	4.1	107.01
SAIFI	4.2	1
CAIDI	4.3	107.01

Including MED (Optional)

SAIDI	4.4	226.81
SAIFI	4.5	1.84
CAIDI	4.6	123.27

Notes:

1) All duration indices (SAIDI, CAIDI) are to be reported in units of minutes.
2) Reports are due on the first business day of April 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, CAIDI, and T_{MED}

KENTUCKY PUBLIC SERVICE COMMISSION

Electric Distribution Utility Annual Reliability Report

SECTION 5: OUTAGE CAUSE CATEGORIES
Excluding MED

CAUSE CODE DESCRIPTION		SAIDI VALUE	CAUSE CODE DESCRIPTION		SAIFI VALUE
Scheduled	5.1.1	4.55	Scheduled	5.2.1	0.08
Major Storms	5.1.2	0.00	Major Storms	5.2.2	0.00
Equipm't or Installation	5.1.3	18.83	Equipm't or Installation	5.2.3	0.21
Age or Deterioration	5.1.4	2.04	Age or Deterioration	5.2.4	0.02
Weather	5.1.5	64.80	Weather	5.2.5	0.50
Birds or Animals	5.1.6	3.95	Birds or Animals	5.2.6	0.04
Public	5.1.7	5.22	Public	5.2.7	0.06
N/A	5.1.8		N/A	5.2.8	
Unknown	5.1.9	4.53	Unknown	5.2.9	0.05
Power Supplier	5.1.10	3.14	Power Supplier	5.2.10	0.05

SECTION 6: WORST PERFORMING CIRCUITS

CIRCUIT IDENTIFIER		SAIDI VALUE	MAJOR OUTAGE CATEGORY
Sub 9 Feeder 1	6.1.1	462.60	EKP Transmission/Unknown/Bird
Sub 1 Feeder 4	6.1.2	363.08	Weather/Trees
Sub 2 Feeder 4	6.1.3	355.88	Weather/Trees
Sub 3 Feeder 1	6.1.4	326.81	Weather/Trees/Animal
Sub 5 Feeder 2	6.1.5	234.89	Weather/Trees
Sub 2 Feeder 2	6.1.6	209.20	Weather/Trees
Sub 13 Feeder 1	6.1.7	205.25	Transmission & Overload
Sub 7 Feeder 2	6.1.8	193.48	Weather/Trees
Sub 11 Feeder 1	6.1.9	183.70	Equipment Failure
Sub 9 Feeder 2	6.1.10	174.20	EKP Transmission

CIRCUIT IDENTIFIER		SAIFI VALUE	MAJOR OUTAGE CATEGORY
Sub 2 Feeder 4	6.2.1	2.70	Weather/Trees
Sub 1 Feeder 4	6.2.2	2.60	Weather/Trees
Sub 4 Feeder 4	6.2.3	2.44	Equipment/Conductor
Sub 13 Feeder 1	6.2.4	2.22	Transmission & Overload
Sub 10 Feeder 1	6.2.5	2.15	Equipment Fault & Weather
Sub 9 Feeder 1	6.2.6	2.00	EKP Transmission/Unknown/Bird
Sub 2 Feeder 1	6.2.7	1.97	Weather/Wind
Sub 4 Feeder 1	6.2.8	1.81	Weather & Public
Sub 2 Feeder 3	6.2.9	1.68	Weather/Trees
Sub 9 Feeder 2	6.2.10	1.33	EKP Transmission

KENTUCKY PUBLIC SERVICE COMMISSION

Electric Distribution Utility Annual Reliability Report

Additional pages may be attached as necessary

SECTION 7: VEGETATION MANAGEMENT PLAN REVIEW

See attached report.

SECTION 8: UTILITY COMMENTS

See attached report.

Shelby Energy Cooperative

Your Touchstone Energy® Partner

2011 PSC Distribution Reliability Report

In regards to Administrative Case NO. 2006-00494

March 29, 2012

Table of Contents

I. Purpose of Report

This report is pursuant to the Public Service Commission's request for all electric distribution utilities to provide annual reports of reliability information as outlined in the findings from administrative case no. 2006-00494. This report documents the reliability performance of **Shelby Energy Cooperative ("Shelby")** in Shelbyville, Kentucky for the 2011 calendar year.

Results in this report will be based on indices defined in IEEE standard 1366-2003, and will be reported on both system wide levels; as well as on the circuit level for the purpose of determining the ten worst performing circuits in the Shelby system. In this analysis major event days will not be included. Major Event Days will be identified based on the Beta Method described in the IEEE 1366 standard.

II. IEEE 1366 Definition of terms

The following terms are defined according to the IEEE standard 1366 and have been used in this report.

1. SAIFI = System Average Interruption Frequency Index calculated as

$$\text{SAIFI} = \frac{\text{Total number of customer interruptions}}{\text{Total number of customers served}}$$

2. SAIDI = System Average Interruption Duration Index given in minutes & hours per year calculated as

$$\text{SAIDI} = \frac{\text{Sum of all customer interruption durations}}{\text{Total number of customers served}} .$$

3. CAIDI = Customer Average Interruption Duration Index

$$\text{CAIDI} = \frac{\text{SAIDI}}{\text{SAIFI}} = \frac{\text{Sum of all customer interruption durations}}{\text{Total number of customer interruptions}}$$

T_{MED} = Major event day identification threshold value calculated as

$T_{MED} = e^{(\alpha + 2.5\beta)}$ where

α = the average of the natural logarithms of each daily SAIDI value for the year

β = the standard deviation of the natural logarithms of the daily SAIDI values

III. Historical Data

Tables III.1 and III.2 show the reliability indices for the Shelby system for the past ten years. Table III.1 reflect all outages excluding outages caused by major storms. The Beta Method outlined in IEEE 1366 for identifying Major Event Days was not used when determining these indices. Table III.2 reflects outages where Major Event Days have been identified and omitted when determining the outage indices according to IEEE 1366.

Table III.1 Historical Indices

	SAIDI	SAIFI	CAIDI
2000	3.68	1.69	2.18
2001	2.32	1.27	1.83
2002	1.61	0.85	1.89
2003	1.30	0.76	1.71
2004	1.10	0.80	1.38
2005	1.09	0.53	2.08
2006	1.84	0.82	2.23

Table III.2 Historical Indices using IEEE 1366

	SAIDI in hrs	SAIDI in mins	SAIFI	CAIDI in hrs	CAIDI in mins
2007	0.91	54.31	0.67	1.35	80.79
2008	1.48	89.04	0.79	1.88	112.71
2009	1.86	111.59	0.85	2.19	131.28
2010	1.57	93.93	0.72	2.17	130.46

IV. 2011 System-wide Reliability Indices

All reliability indices for the Shelby system for 2011 were calculated with Major Event Days excluded. The Major Event Day Threshold (T_{MED}) was determined based on the SAIDI (in mins)/day values for 2006, 2007, 2008, 2009, and 2010 and equals **11.80** SAIDI/day. The Major Event Days (days that exceeded T_{MED}) for 2011 are identified in Table IV.1. Monthly and year total reliability indices for 2011 are shown in Table IV.2.

Table IV.1 Major Event Days

Date	Related Cause	SAIDI /day (min)
4/20/11	Weather / Trees	12.95
4/23/11	Weather/EKP Transmission	13.11
5/5/11	EKP/KU Substations 5&7 outage	24.32
5/23/11	Weather/EKP Transmission	31.23
8/13/11	Weather/EKP Transmission	38.21

Table IV.2 2011 Reliability Indices

2011 Reliability Indices Excluding Major Event Days By Month

Months Totals	SAIFI	SAIDI		CAIDI
JANUARY	0.04	4.84		112.29
FEBRUARY	0.09	5.68		62.02
MARCH	0.04	8.04		190.03
APRIL	0.10	12.46		121.12
MAY	0.06	10.93		187.95
JUNE	0.14	9.44		68.24
JULY	0.06	6.98		109.79
AUGUST	0.15	24.06		159.24
SEPTEMBER	0.14	10.21		74.13
OCTOBER	0.04	2.95		73.41
NOVEMBER	0.09	7.57		88.68
DECEMBER	0.04	3.84		88.68
YEARLY TOTAL	**1.00**	**107.01**	**mins**	**107.01**
		1.78	**hours**	**1.78**

V. Outage Causes

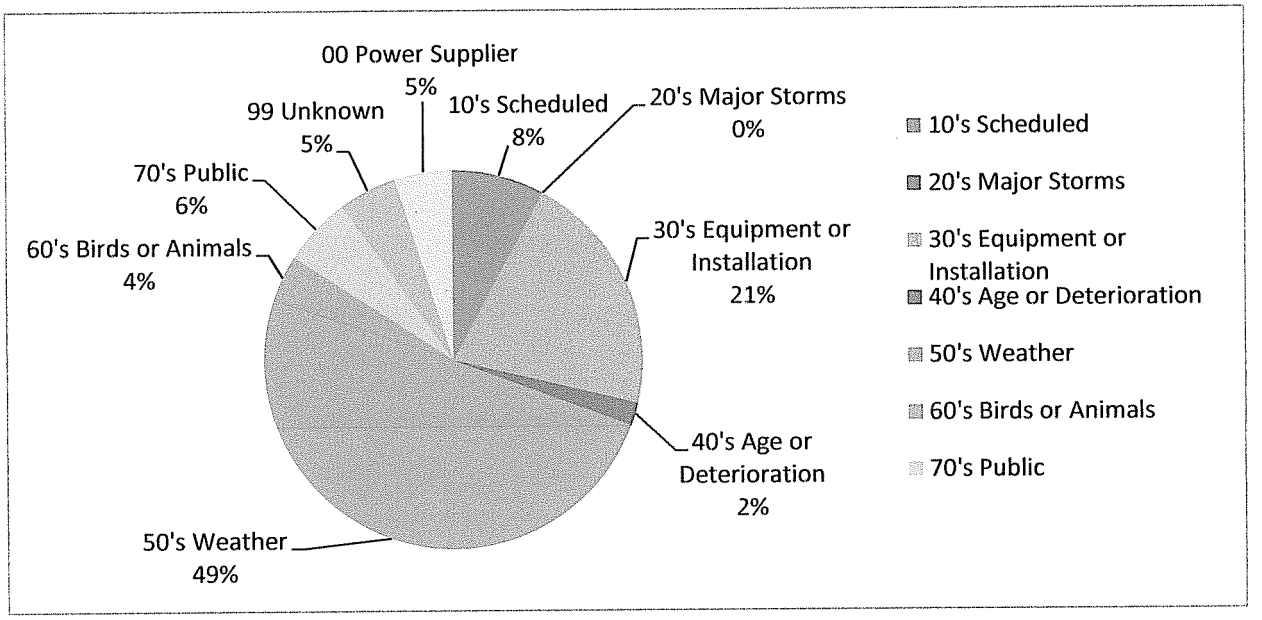
Shelby tracks the causes of outages to the best of their ability. There are 9 main groups of cause categories. Table V.1 shows the reliability indices for each cause category group. Charts V.1 – V.3 show the percent contribution of each cause category to the overall system reliability indices.

Table V.1 Outages by Cause Codes

2011 Outages excluding Major Event Days By Cause Codes

Cause Code	Description	No. Of Consumers	Consumer Hours	SAIFI	SAIDI	CAIDI
10's	Scheduled	1217	1162.08	0.08	4.55	56.88
20's	Major Storms	0	0.00	0.00	0.00	0.00
30's	Equipment or Installation	3252	4806.07	0.21	18.83	89.67
40's	Age or Deterioration	275	519.98	0.02	2.04	0.01
50's	Weather	7596	16540.90	0.50	64.80	129.60
60's	Birds or Animals	666	1007.84	0.04	3.95	98.75
70's	Public	846	1332.70	0.06	5.22	87.00
99	Unknown	691	1155.34	0.05	4.53	90.60
00	Power Supplier	743	802.44	0.05	3.14	62.87

Chart V.1 SAIFI by Cause Code



V. Outage Causes - continued

Chart V.2 SAIDI by Cause Code

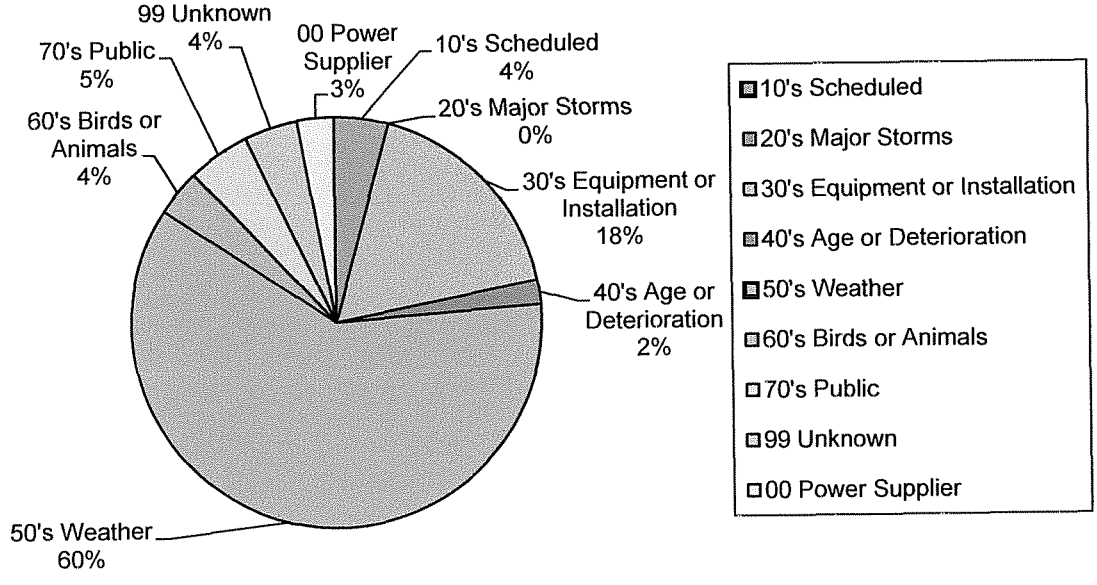
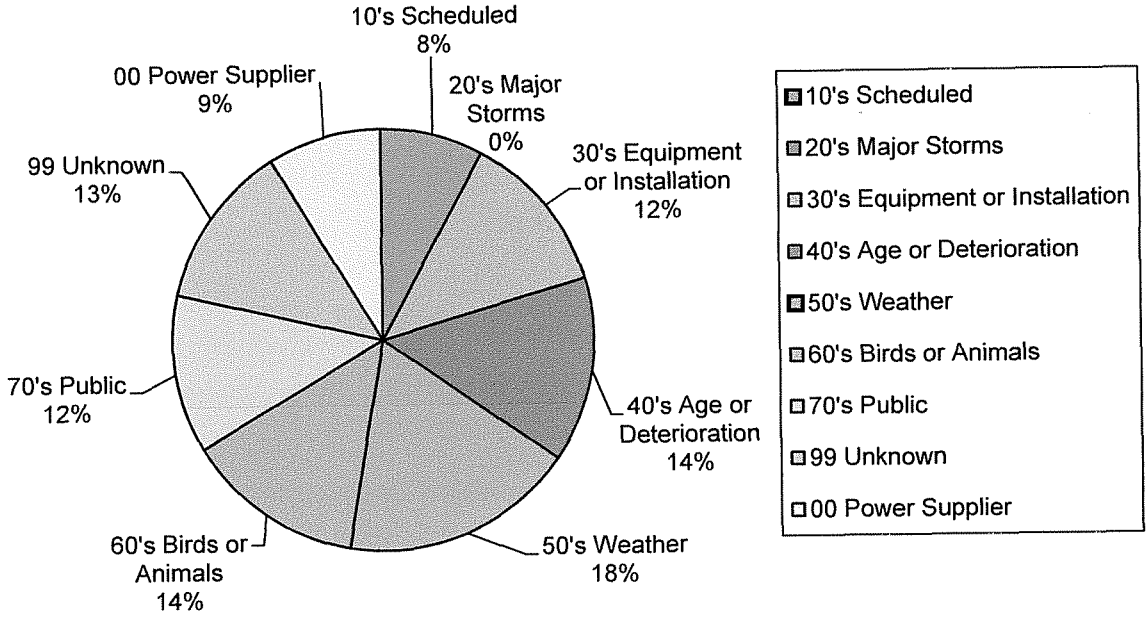


Chart V.3 CAIDI by Cause Code



VI. Ten Worst Circuits

The reliability indices were calculated for each feeder for 2011, and the ten worst performing feeders for SAIFI and SAIDI were identified. Each feeder was analyzed as its own "system" in that only the consumers served on a given feeder were used in the calculation of the index for that feeder. Tables VI-1 through VI-2 on the following pages show the results of the feeder analysis for each index listed from worst to best in reliability.

Weather events were the main cause affecting the reliability of Shelby Energy's distribution system. Shelby Energy strives to design, maintain, and operate its distribution system to minimize outage times and affected members due to adverse weather conditions.

Shelby Energy continues to use wild life guards and insulated cover up material in substations and the distribution equipment where electrical clearances are close.

Circuits where poor performance can be attributed to material/equipment faults continue to be evaluated for replacement and/or up-grade.

Substation Reference Guide

Sub Number	Sub Name	Location
1	Logan 1	Shelby
2	Clay Village	Shelby
3	New Castle	Henry
4	Campbellsburg	Henry
5	Bedford	Trimble
6	Southville	Shelby
7	Milton	Trimble
8	Budd	Shelby
9	Bekeart 1	Shelby
10	Logan 2	Shelby
11	Jericho	Henry
12	Bekeart 2	Shelby
13	Long Run	Shelby
14	Bekeart 3	Shelby

Table VI.1 Circuits with 10 worst SAIFI indices highlighted

Reliability Rankings from Greatest to Least By SAIFI

Substation	Feeder	No. Of Consumers Out	Consumer Hours	No. Of Consumers on Feeder	SAIFI	Major cause
2	4	627	1376.05	232	2.70	**Weather/Trees**
1	4	1016	2366.07	391	2.60	**Weather/Trees**
4	4	549	308.23	225	2.44	**Equipment/Conductor**
13	1	685	1053.62	308	2.22	**Transmission&Overload**
10	1	1774	2083.01	824	2.15	**Equipment Fault&Weather**
9	1	2	7.71	1	2.00	**EKP Xmission/Unk/Bird**
2	1	734	806.22	372	1.97	**Weather/Wind**
4	1	1122	1754.40	619	1.81	**Weather & Public**
2	3	1807	3041.53	1078	1.68	**Weather/Trees**
9	2	4	8.71	3	1.33	**EKP Transmission**
2	2	530	1436.50	412	1.29	
13	2	549	647.44	435	1.26	
7	2	818	2099.21	651	1.26	
4	2	711	1274.21	612	1.16	
3	1	324	1601.35	294	1.10	
5	3	595	371.94	584	1.02	
5	2	347	1334.98	341	1.02	
11	1	631	2066.61	675	0.93	
3	2	512	894.03	549	0.93	
1	2	120	147.97	143	0.84	
3	3	367	222.02	485	0.76	
7	1	60	162.25	87	0.69	
7	3	119	361.74	213	0.56	
11	2	273	337.89	574	0.48	
7	4	169	379.31	375	0.45	
5	1	255	273.12	607	0.42	
6	2	87	120.20	233	0.37	
1	3	136	201.42	594	0.23	
6	1	243	338.29	1216	0.20	
4	3	85	119.01	461	0.18	
6	3	56	77.21	460	0.12	
11	3	36	26.94	335	0.11	
2	5	27	51.83	258	0.10	
5	4	13	42.29	307	0.04	
8	1	0	0.00	1	0.00	
12	1	5440	9061.74	0	0.00	
12	2	0	0.00	24	0.00	
12	3	0	0.00	11	0.00	
14	2	0	0.00	4	0.00	

Table VI.2 Circuits with 10 worst SAIDI indices highlighted

Reliability Rankings from Greatest to Least By SAIDI

Substation	Feeder	No. Of Consumers Out	Consumer Hours	No. Of Consumers on Feeder	SAIDI in mins	SAIDI in hours	Major cause
9	1	2	7.71	1	462.60	7.71	EKP Xmission/Unk/Bird
1	4	1016	2366.07	391	363.08	6.05	Weather/Trees
2	4	627	1376.05	232	355.88	5.93	Weather/Trees
3	1	324	1601.35	294	326.81	5.45	Weather/Trees/Animals
5	2	347	1334.98	341	234.89	3.91	Weather/Trees
2	2	530	1436.50	412	209.20	3.49	Weather/Trees
13	1	685	1053.62	308	205.25	3.42	Transmission&Overload
7	2	818	2099.21	651	193.48	3.22	Weather/Trees
11	1	631	2066.61	675	183.70	3.06	Equipment Failure
9	2	4	8.71	3	174.20	2.90	EKP Transmission
4	1	1122	1754.40	619	170.05	2.83	
2	3	1807	3041.53	1078	169.29	2.82	
10	1	1774	2083.01	824	151.68	2.53	
2	1	734	806.22	372	130.04	2.17	
4	2	711	1274.21	612	124.92	2.08	
7	1	60	162.25	87	111.90	1.86	
7	3	119	361.74	213	101.90	1.70	
3	2	512	894.03	549	97.71	1.63	
13	2	549	647.44	435	89.30	1.49	
4	4	549	308.23	225	82.19	1.37	
1	2	120	147.97	143	62.09	1.03	
7	4	169	379.31	375	60.69	1.01	
5	3	595	371.94	584	38.21	0.64	
11	2	273	337.89	574	35.32	0.59	
6	2	87	120.20	233	30.95	0.52	
3	3	367	222.02	485	27.47	0.46	
5	1	255	273.12	607	27.00	0.45	
1	3	136	201.42	594	20.35	0.34	
6	1	243	338.29	1216	16.69	0.28	
4	3	85	119.01	461	15.49	0.26	
2	5	27	51.83	258	12.05	0.20	
6	3	56	77.21	460	10.07	0.17	
5	4	13	42.29	307	8.27	0.14	
11	3	36	26.94	335	4.83	0.08	
8	1	0	0.00	1	0.00	0.00	
12	1	5440	9061.74	0	0.00	0.00	
12	2	0	0.00	24	0.00	0.00	
12	3	0	0.00	11	0.00	0.00	
14	2	0	0.00	4	0.00	0.00	

APPENDIX A

SHELBY ENERGY COOPERATIVE
620 Old Finchville Road
Shelbyville, KY

VEGETATION MANAGEMENT PLAN (VMP)

Shelby Energy Cooperative ("Shelby") is an electric distribution system serving ten (10) counties in north-central Kentucky: Shelby, Henry, Trimble, Carroll, Owen, Oldham, Jefferson, Franklin, Spencer, and Anderson. The system consists of approximately 15,379 meters / accounts and approximately 1,820 miles of overhead and underground primary conductor. Shelby has approximately 301 miles of secondary and services. Members are served by eleven (11) substations that are owned and operated by East Kentucky Power Cooperative with headquarters in Winchester, KY. An attachment showing the service territory and substations for Shelby is included (Exhibit 1).

Vegetation management (VM) plays an integral role in accomplishing the mission statement for Shelby Energy Cooperative:

> *"Shelby Energy Cooperative will provide safe, reliable and cost-effective energy service, while preserving our environment. Our mission is to educate members, employees, and the public with knowledge and tools to use energy safely and efficiently to enhance their quality of life."*

Maintaining effective VM is a major factor in promoting a safer environment within Shelby's certified territory. VM reduces the possibility of accidental contact with energized power lines thus providing safer conditions for the public, for employees and for contractors. Reliability and power quality enhancements are also afforded by proper VM.

RIGHT OF WAY (ROW) CLEARING CYCLE

Shelby uses a clearing cycle of four (4) to five (5) years that combines ROW trimming, spraying and mowing. The variance of four (4) to five (5) years is used to adjust the clearing cycle based on yearly growing conditions. In 2011, Shelby helicopter patrolled

approximately 250 circuit-miles assessing the present condition of ROW. This in turn helped Shelby prioritize the circuits to be managed. A total of three (3) hourly contract trimming crews (crews) are utilized by Shelby with no less than one (1) crew working year around as weather and/or work permits. One (1) spraying crew is used several months during the summer season. On average, 350 circuit-miles are cleared of vegetation by trimming, cutting and/or spraying annually. Shelby has elected for 2012 to bid feeders to different tree service companies. These crews may consist of a total of ten (10) or more personnel and may be equipped with bucket trucks, chippers, "sky track" machines, Fecon mower and bush hog units. These crews and equipment enables Shelby to cover more rough terrain and clear ROW issues in many cross country locations. Shelby complies with the RUS ROW Clearing Guide ~ M1.30G.

RELIABILITY CRITERIA AND REPORTS

Shelby's operations and engineering (O&E) employees monitor daily, monthly, and annual outage reports and service requests initiated by employees, contractors and cooperative members. This information is reviewed to determine if trends exist indicating a deterioration of service quality or reliability within any specific area. In addition, Shelby utilizes the services of a professional engineering consultant to review outage data and assist in resolving service quality or reliability issues.

PERFORMANCE OF MAINTENANCE

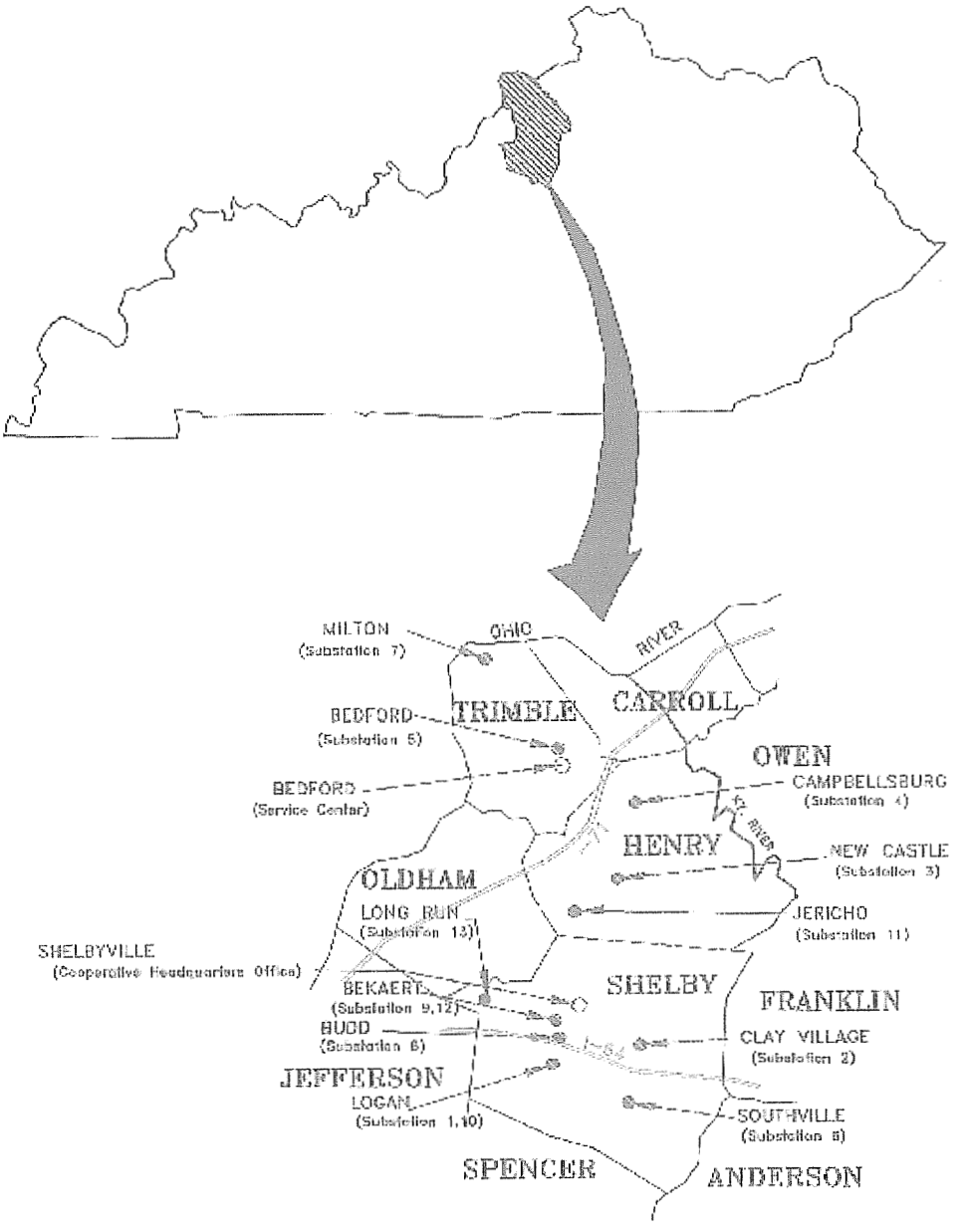
The ROW clearing cycle is established and adjusted as needed to manage the ROW cycle and maintain a high standard of service, quality and reliability. Trouble areas receive timely attention to resolve associated outage or service issues as discovered. Shelby O&E personnel and contractors report problems during their routine work and patrolling efforts to define locations requiring attention to ROW issues. These issues are handled on a case-by-case basis depending upon the severity of the issue.

PLAN EVALUATION

Shelby regularly monitors outages to determine their underlying cause(s). These findings are reviewed monthly, annually, and over a rolling five (5) year period to determine if trending indicates a decline in service quality or reliability is developing within an area of the cooperative's system. Employees of Shelby's O&E department work with a professional engineering consultant to calculate, review, and evaluate standard reliability

indices of SAIFI, SAIDI, and CAIDI. Shelby's O&E personnel and its professional engineering consultant continuously monitor and verify that reliability issues are resolved in such a manner that best benefits the members of the cooperative.

Exhibit # 1



SHELBY ENERGY COOPERATIVE SERVICE AREA

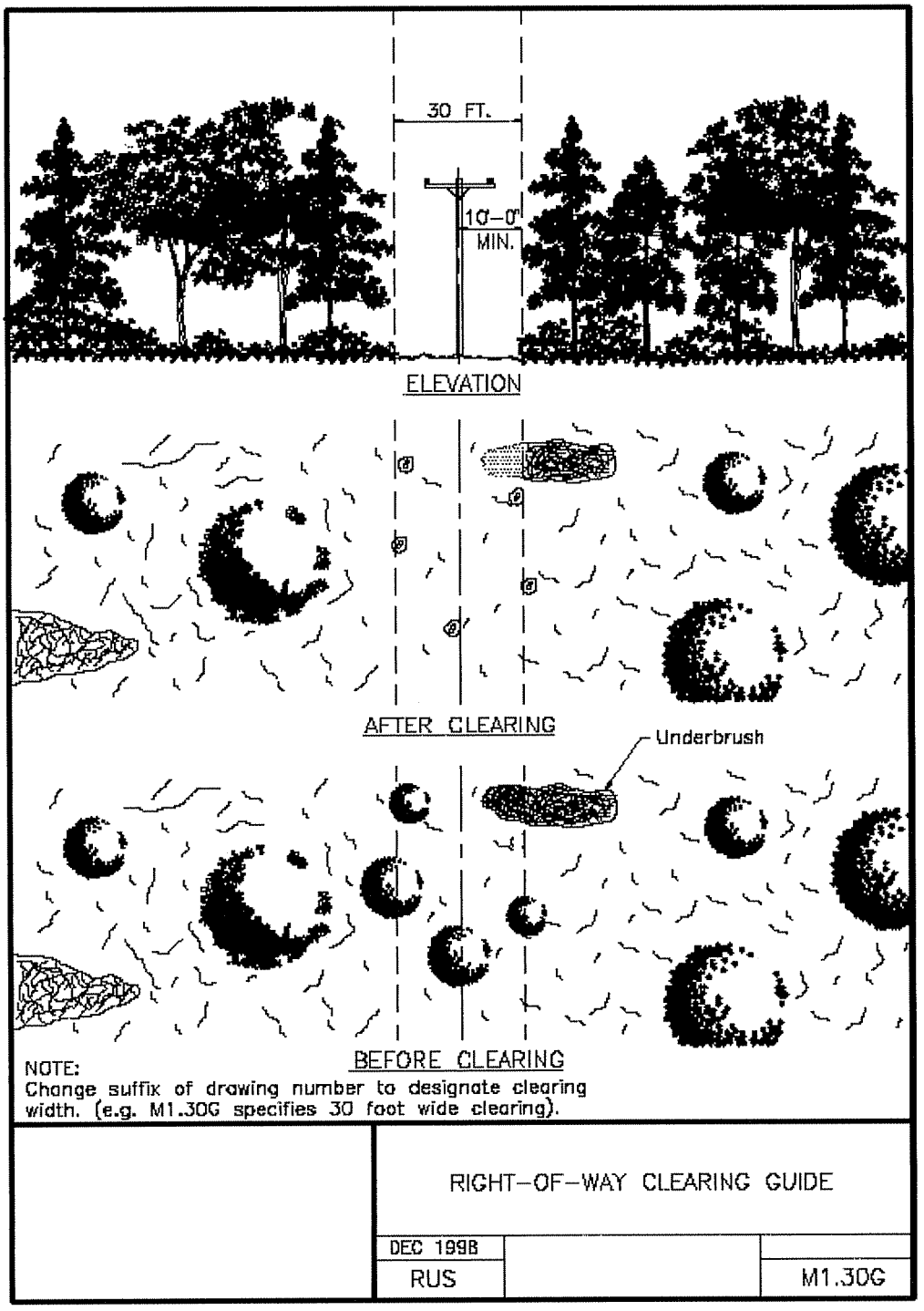
Exhibit # 2

RIGHT-OF-WAY CLEARING SPECIFICATIONS

The right-of-way shall be prepared by removing trees, clearing underbrush, and trimming trees so that the right-of-way is cleared close to the ground and to the width specified. However, low growing shrubs, which will not interfere with the operation or maintenance of the line, shall be left undisturbed if so directed by the owner. Slash may be chipped and blown on the right-of-way if so specified.

The landowner's written permission shall be received prior to cutting trees outside of the right-of-way. Trees fronting each side of the right-of-way shall be trimmed symmetrically unless otherwise specified. Dead trees beyond the right-of-way which would strike the line in falling shall be removed. Leaning trees beyond the right-of-way which would strike the line in falling and which would require topping if not removed, shall either be removed or topped, except that shade, fruit, or ornamental trees shall be trimmed and not removed, unless otherwise authorized.

Exhibit #2


30 FT.
10'-0"
MIN.
ELEVATION
AFTER CLEARING
Underbrush
BEFORE CLEARING
NOTE:
Change suffix of drawing number to designate clearing width. (e.g. M1.30G specifies 30 foot wide clearing).
RIGHT-OF-WAY CLEARING GUIDE
DEC 1998
RUS
M1.30G