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July 13, 2005

Beth O'Donnell, Executive Director
Public Service Commission
211 Sower Blvd
P.O. Box 615
Frankfort, KY 40602

Case 2005-00306

Re: Shelby Energy Cooperative, Inc. - Application for Certificate of Convenience and Necessity

Dear Ms. O'Donnell:

Enclosed please find one original and ten (10) copies, plus an extra first page only, of Shelby Energy Cooperative, Inc.'s Application for Certificate of Convenience and Necessity. Please file the original and ten copies with the Commission and return to me the file-stamped first page copy. For your convenience I have enclosed a self-addressed stamped envelope.

Due to the voluminous nature of the work plan, we enclose the original and three copies of the work plan. We will be happy to provide additional copies of the work plan if the Commission desires.

Yours truly,

MATHIS, RIGGS & PRATHER, P.S.C.

BY: _____
Donald T. Prather

DTP/pm
Enclosures
Cc: Dudley Bottom, Jr.
Don/sec/stewart/PSC filing

COMMONWEALTH OF KENTUCKY

BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

THE APPLICATION OF SHELBY ENERGY COOPERATIVE INC. FOR A CERTIFICATE OF CONVENIENCE AND NECESSITY

Case 2005-00306

APPLICATION

Shelby Energy Cooperative Inc., hereinafter called the Applicant, respectfully advises the Commission that:

1. Applicant is engaged in the sale of electric power over its approximately 1964 miles of line at retail rates to its approximately 14,059 meters in Anderson, Carroll, Franklin, Henry, Jefferson, Oldham, Owen, Shelby, Spencer, and Trimble counties.
2. The address of the applicant is 620 Old Finchville Road, Shelbyville, Kentucky 40065, and its Articles of Incorporation as amended are on file with the Commission.
3. This application is for the approval by the Commission of the Applicant's Construction Work Plan for 2005 – 2009. The Work Plan consists of:

   New Distribution Lines, an additional 170 miles, budgeted at $5,250,000.00; Line Conversions at $4,031,184.00; Distribution Equipment at $4,203,640.00 and Security Lights at $286,450, and acquisitions and/or construction of certain appurtenances thereto, including meters, voltage regulators, autoboosters, auto transformers, sectionalizing devices, new member extensions, increase capacity of the existing consumers, pole replacements, and capacitors. These extensions and improvements will be used for the purpose of increasing the capacity of existing services to present and future consumers, and all of the extensions will be ordinary extensions built in the usual course of business or replacement of obsolete equipment now in Applicant's physical plant. No construction will be performed in conflict with any adjoining utility

and all of such extensions and improvements will be built in the territory certified to the Applicant.

4. There is a demand throughout Kentucky counties served by the applicant for rural electrification, and Applicant seeks to improve and extend its existing system in order to render better service to its existing and future members. Financing of the construction and acquisition outlined above, and the entirety of the work plan, will be exclusively through the Rural Utility Service, and will in no way impair the Applicant's ability to perform the services that it is authorized, empowered and entrusted to perform.

Wherefore, the Applicant now moves the Public Service Commission of the Commonwealth of Kentucky to grant a Certificate of Convenience and Necessity authorizing the construction and acquisition as outlined in this Petition, which the Applicant has requested and which the Commission has discretion to grant pursuant KRS 278.020, upon determination that there is a need and demand for the service.

Respectfully submitted by the Applicant, on July 12, 2005 by its authorized representative.

SHELBY ENERGY COOPERATIVE INC.

BY: Don Prather

DON PRATHER
Attorney for Applicant
500 Main Street
Shelbyville, Kentucky 40065
(502) 633-5220

SHELBY ENERGY COOPERATIVE, INC.
2005 – 2009 CONSTRUCTION WORK PLAN REPORT

Kentucky 30 Shelby

TABLE OF CONTENTS

PURPOSE OF REPORT

This report documents the engineering analysis of, and summarizes the proposed construction for Shelby Energy Cooperative, Inc.'s (SEC) electric distribution system for the four-year planning period of 2005-2009.

The report also provides engineering support in the form of descriptions, costs and justifications of the required new facilities for a loan application to RUS in order to finance the proposed construction program.

GENERAL BASIS OF STUDY

The winter 2009 projected total peak system load was taken from the 2004 Load Forecast (LF) as approved by RUS. Residential and small commercial loads were grown at rates consistent with the LF.

From 1999-2004, the annual increase in residential energy sales was 4.8%. This rate is projected to be 3.8% over the next five years. Small commercial sales are projected to increase at 4.2% over the next five years. There is a 4.5% projected increase in large commercial energy sales over the next five years.

System analysis models are based on non-coincidental (NC) system peaks that are outlined in the LF. The projected winter 2009 NC peak (based on LF and GFR meeting) is 117,000 kW. The system annual load factor is projected to average 53.0% over the next four years.

The existing winter and summer growth models were examined for what is a winter-peaking system. The existing summer model was reviewed to ensure that any system deficiencies for the cooling load closely tracked the winter model. This was determined to be the case.

The SEC 1999-2018 Long Range Plan (LRP) load projections and improvement recommendations were reviewed and they generally agree with scope of the 2005-2009 CWP recommendations. A review of the LRP is included in this report.

A RUS Operations and Maintenance Survey (FORM 300) has been completed with the RUS GFR. This survey is used to determine portions of the construction required to replace physically deteriorated equipment and material, upgrade areas of the system to conform to code or safety requirements, and improve the reliability and quality of service.

GENERAL BASIS OF STUDY (cont.)

A system analysis using RUS guidelines and the SEC Design Criteria was performed on all of the substations and distribution lines of the system. Milsoft Integrated Solutions' PC-Based Distribution Analysis Program – "Windmil" was used to analyze the existing system configuration that was modeled with the projected load growth.

SUMMARY - RESULTS OF PROPOSED CONSTRUCTION

Upon completion of the proposed construction, the system will provide adequate and dependable service to 15,173 residential customers as well as 9 large power loads and 517 small commercial loads. Average monthly residential usage is projected to be 1,391 kWh. It is estimated that there will be 1,700 idle services.

A majority of this plan deals with the replacement of single-phase conductor. There are several three-phase conductor replacements. 95 circuit miles of conductor replacement and conversion will take place in the four-year plan period. Conductor replacement line sections were selected based on conductor condition, operational experience and the number of customers served.

A new double circuit feeder out of the New Castle Substation will relieve end-of-line loading on two Clay Village feeders and will defer a new distribution substation in the Defoe area. This new feed will also eliminate the need for a distribution feeder from Bluegrass Energy in southeast Henry County.

East Kentucky Power Cooperative has discussed the possibility of a transmission feed from US 60, south of the Clay Village Substation, westward along the I-64 corridor into the heart of Shelby County. This project would likely occur in the next construction work plan period. This line would allow SEC to consider a substation in the rapidly growing Brittany Estates area. This area is in close proximity to the I-64 exit and is experiencing solid residential and commercial growth.

Executive Summary

Overall Results *(continued)*

Table 1-2
Shelby Energy Cooperative
2004 Load Forecast
Summary of Sales Growth

Time Period	Residential	Small Commercial	Large Commercial	Other	Total Sales
5 Year Growth Rates					
1994-1999	5.9%	2.4%	7.7%	12.0%	6.0%
1999-2004	4.8%	2.3%	2.7%	14.8%	3.6%
2004-2009	3.8%	4.2%	4.5%	0.0%	4.1%
2009-2014	3.3%	3.3%	2.3%	0.0%	2.9%
2014-2019	3.5%	2.7%	3.3%	0.0%	3.3%
2019-2024	3.5%	2.2%	3.4%	0.0%	3.3%
10 Year Growth Rates					
1994-2004	5.3%	2.4%	5.2%	13.4%	4.8%
2004-2014	3.6%	3.7%	3.4%	0.0%	3.5%
2014-2024	3.5%	2.5%	3.3%	0.0%	3.3%

Table 1-10

Shelby Energy
Peak Day Weather Scenarios

Winter Peak Day Minimum Temperatures

	Mild	Normal	Extreme		
Degrees	10	-3	-12	-17	-25
Probability	*99%*	*50%*	*20%*	*10%*	*3%*
Occurs Once Every		**2 Years**	**5 Years**	**10 Years**	**30 Years**

Noncoincident Winter Peak Demand - MW

Season	Mild	Normal	Extreme		
2004 - 05	94	103	109	112	118
2005 - 06	98	107	113	117	122
2006 - 07	103	112	118	122	127
2007 - 08	106	116	122	126	132
2008 - 09	111	121	128	132	138
2009 - 10	115	125	132	136	142
2010 - 11	117	128	135	139	145
2011 - 12	121	131	139	143	150
2012 - 13	125	136	144	148	155
2013 - 14	129	141	149	153	160
2014 - 15	133	145	153	158	165
2015- 16	137	149	157	162	169
2016 - 17	142	154	163	168	175
2017 - 18	147	160	168	173	181
2018 - 19	152	166	175	180	188
2019-2020	157	171	180	185	194
2020-2021	163	177	187	192	200
2021-2022	168	183	192	198	207
2022-2023	174	188	199	204	213
2023-2024	179	194	204	210	220

Summer Peak Day Maximum Temperatures

	Normal	Extreme		
Degrees	94	98	100	104
Probability	*50%*	*20%*	*10%*	*3%*
	2 Years	**5 Years**	**10 Years**	**30 Years**

Noncoincident Summer Peak Demand - MW

Year	Normal	Extreme		
2004	85	94	98	107
2005	88	97	102	110
2006	92	101	105	114
2007	96	105	110	119
2008	99	108	113	123
2009	104	113	118	128
2010	106	116	121	132
2011	108	119	124	135
2012	111	122	127	138
2013	115	126	132	143
2014	119	130	136	147
2015	122	134	140	151
2016	125	137	143	155
2017	129	141	148	160
2018	134	146	153	165
2019	138	151	158	171
2020	142	156	163	176
2021	147	161	168	182
2022	152	166	173	187
2023	156	171	178	192
2024	161	175	183	198

LOAD FORECAST SUMMARY	1. Borrower Designation	KY 30
	2. Name of Borrower	Shelby Energy Cooperative
	3. Date	May 21, 2004

CLASS OF CONSUMER	NO. OF CONSUMERS			AVG. MONTHLY KWH USAGE		
	2003	2008	2013	2003	2008	2013
4. Residential	13,185	15,173	17,312	1,284	1,391	1,438
5. Seasonal						
6. Irrigation						
7. Commercial & Industrial 1000 kVa or less	517	572	632	9,033	10,147	10,876
8. Commercial & Industrial over 1000 kVa	8	9	10	1,651,288	1,767,483	1,856,296
9. Public Street & Highway Lighting	17	17	17	665	656	656
10. Other Sales to Public Authorities						
11. Sales for Resale - REA Borrowers						
12. Sales for Resale - Others						

TOTAL SYSTEM POWER REQUIREMENTS

ITEM	2003	2008	2013
13. Annual MWh Requirements	435,574	537,112	631,207
14. Including Losses @	4.1%	4.3%	4.3%
15. Annual Load Factor (Based on maximum monthly system peak demand)	51.7%	53.0%	52.9%
16. Maximum Monthly System Peak Demand (MW) Noncoincident	96.1	115.6	136.3

17. Source(s) of Supply: East Kentucky Power Cooperative, Inc.

18. Previous Power Requirements Study Dated: August 2002

19. Comments (Use an additional sheet if more space is needed)

Borrower's General Manager (Signature)	Date	RUS General Field Representative (Signature)	Date
Dudley Bottom, Jr.	07-22-04		11-2-04

RUS Form 341

SERVICE AREA

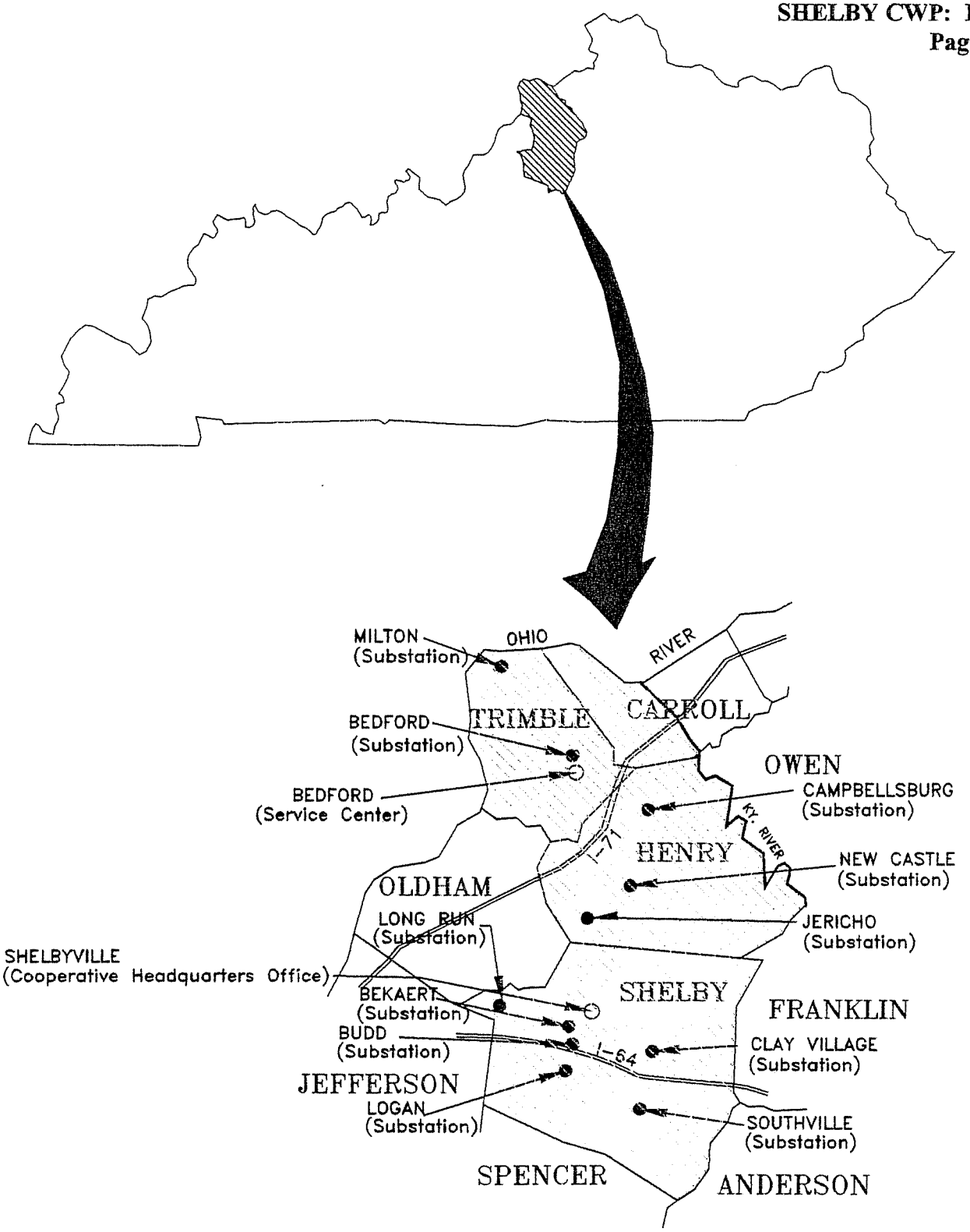
Shelby Energy Cooperative, Inc. is a RUS-funded electric distribution cooperative. SEC is located in north central Kentucky between Louisville and Lexington. SEC serves portions of Carroll, Henry, Shelby and Trimble Counties with a few members in six other surrounding counties. The headquarters are located in Shelbyville, Kentucky (Shelby County) with a branch office in Bedford (Trimble County). *See Map on following page.*

The principal counties served by SEC are rural with a high percentage of people relying on agricultural enterprises, manufacturing and government services for income. Agricultural products include tobacco, corn, dairy, beef cattle and swine.
A number of commercial and industrial areas are in the service territory. Steady growth is projected for new commercial, small manufacturing and residential customers in selected areas of the system. The Shelby Industrial Park remains the focal point of SEC's present and future industrial and large commercial growth.

The following data is from SEC's 12/04 RUS Form 7:

Total Services in Place	***15,995***
MWH Purchases	***444,919***
MWH Sold	***425,342***
Maximum MW Demand	***93,795***
Total Utility Plant	***$51,041,348***
Plant Dollars Per Member	***$3,191***
Consumers/Mile	***8.09***

SEC has 39 distribution circuits with 14 of the circuits operating at 14,400/24,900 kV. The remaining circuits operate at 7,200/12.47 kV.



SHELBY ENERGY COOPERATIVE SERVICE AREA

GENERATION and TRANSMISSION POWER SUPPLIER

East Kentucky Power Cooperative (EKPC) provides all power and energy needs to SEC and fifteen other distribution cooperatives. EKPC is located in Winchester, Kentucky.

The Power Requirements Study (LF) is a joint effort between SEC and EKPC. SEC provides loading data and system growth predictions to EKPC for use in the LF growth models.

All new distribution, transmission, and substation construction requirements are considered simultaneously as a "one system" concept - between SEC & EKPC - for the orderly and economical development of the total system. All of the recommendations relative to power supply and delivery are discussed with EKPC.

SUMMARY OF CONSTRUCTION PROGRAM AND COSTS

Shelby Energy Cooperative's distribution system was analyzed in order to identify the construction requirements needed to adequately serve the projected CWP load of 117 MW. Improvements were identified based on voltage drop, conductor loading, system reliability improvement, economic conductor analysis and operational experience. A narrative list of system improvements is located in Section IV.

A breakdown of proposed construction projects by RUS 740C codes is listed below in Table I-C-1.

Table I-C-1
System Additions and Improvements Summary

RUS Form 740C Category	Category Name	Estimated Cost
100	**New Distribution Line**	**$5,250,000**
300	**Line Conversion & Replacement**	**$4,031,184**
600	**Misc. Equip & Poles**	**$4,203,640**
700	**Security Lights**	**$286,450**
	2005-2009 CWP TOTAL	**$13,771,274**

100 – New Construction planned to serve 2,000 new services.

300 – 95 miles of conductor upgrading, replacement and feeder rehabilitation.

600 – Miscellaneous distribution equipment and pole changes. This includes voltage regulators, sectionalizing, meters, transformers, pole changes and increased service capacity upgrades.

700 – Other Distribution Items - Security Lights 702.

SHELBY ENERGY COOP 2005-2009 CWP
COST SUMMARY SPREADSHEET

NEW CONSTRUCTION -- RUS CODE 100

ITEM	RUS CODE	AVE. $/CONSUMER	# CONS.		EXT. COST	2005	2006	2007	2008	TOTAL
New Services	100	$2,625	2000		$5,250,000	$1,250,000	$1,287,500	$1,332,500	$1,380,000	$5,250,000
		TOTAL CODE 100:								

LINE CONVERSION / REPLACEMENT - RUS CODE 300

SUB - SECTION	RUS CODE	INST. COND/# PH	$/MILES	# OF MILES	EXT. COST	2005	2006	2007	2008	TOTAL
Logan I - 486	301	#2 ACSR -1 Phase	$21,000	1.9	$39,900	$39,900				$39,900
Logan I - 430	302	#2 ACSR -1 Phase	$23,290	1.6	$37,264				$37,264	$37,264
Logan I - 477	303	#2 ACSR -2 Phase	$32,000	1.0	$32,000	$32,000				$32,000
Logan I - 473	304	#2 ACSR -2 Phase	$32,000	0.6	$19,200	$19,200				$19,200
Logan I - 476	305	#2 ACSR -1 Phase	$21,000	2.1	$44,100	$44,100				$44,100
Logan I - 489	306	#2 ACSR -2 Phase	$32,000	3.0	$96,000	$96,000				$96,000
Clayvillage - 360, 357-359	307	#2 ACSR -1 Phase	$22,500	3.7	$83,250			$83,250		$83,250
Clayvillage - 396, 896, 398 & 400	308	1/0 ACSR -3 Phase	$46,575	4.3	$200,273		$200,273			$200,273
Clayvillage - 397 & 399	309	#2 ACSR -1 Phase	$21,730	1.8	$39,114		$39,114			$39,114
Clayvillage - 422	310	336.4 ACSR - 3 Phase	$71,770	1.3	$93,300			$93,300		$93,300
Clayvillage - 361	311	#2 ACSR -2 Phase	$34,320	1.9	$65,208			$65,208		$65,208
Clayvillage - 313 & 314	312	#2 ACSR -1 Phase	$23,290	2.2	$51,238				$51,238	$51,238
Clayvillage - 309	313	#2 ACSR -1 Phase	$21,730	1.6	$34,768		$34,768			$34,768
Clayvillage - 625, 419 & 420	314	1/0 ACSR -3 Phase	$45,000	4.2	$189,000	$189,000				$189,000
Clayvillage - 345	315	#2 ACSR -2 Phase	$34,320	1.6	$54,912			$54,912		$54,912
Clayvillage - 393	316	#2 ACSR -2 Phase	$34,320	0.6	$20,592			$20,592		$20,592
Clayvillage - 341	317	#2 ACSR -1 Phase	$22,500	1.7	$38,250			$38,250		$38,250
Clayvillage - 364	318	#2 ACSR -1 Phase	$23,290	2.5	$58,225				$58,225	$58,225
Clayvillage - 757	319	#2 ACSR -1 Phase	$21,730	1.2	$26,076		$26,076			$26,076
Clayvillage - 366	321	#2 ACSR -1 Phase	$21,730	3.4	$73,882		$73,882			$73,882
New Castle - 303, 291, 293 & 294	322	DCT 336.4ACSR	$124,200	6.0	$745,200		$745,200			$745,200
New Castle - 284-287 & 289	323	336.4 ACSR - 3 Phase	$69,350	3.4	$235,790		$235,790			$235,790
New Castle - 306, 308, 929 & 830	324	1/0 ACSR -3 Phase	$46,575	3.9	$181,643		$181,643			$181,643
Campbellsburg - 220 & 221	325	#2 ACSR -1 Phase	$23,290	3.8	$88,500				$88,500	$88,500
Campbellsburg - 232 & 235	326	#2 CU Rehab	$12,000	3.6	$43,200				$43,200	$43,200
Campbellsburg - 150, 153, 154 & 158	327	#2 CU Rehab	$12,000	4.2	$50,400				$50,400	$50,400
Campbellsburg - 234	328	#2 CU Rehab	$12,000	2.0	$24,000				$24,000	$24,000
Bedford - 787, 89, 87 & 886	329	336.4 ACSR - 3 Phase	$67,000	3.8	$254,600	$254,600				$254,600
Bedford - 115	330	#2 ACSR -2 Phase	$35,480	1.5	$53,220				$53,220	$53,220
Bedford - 190 & 628	331	336.4 ACSR - 3 Phase	$67,000	1.8	$120,600	$120,600				$120,600
Southville - 506	332	#2 ACSR -1 Phase	$23,290	4.3	$100,147				$100,147	$100,147
Southville - 515 & 733	333	4/0 ACSR -3 Phase	$59,000	3.4	$200,600		$200,600			$200,600
Southville - 505, 547 & 498	334	#2 ACSR -2 Phase	$35,480	1.6	$56,770				$56,770	$56,770
Milton - 12, 629, 36, 38 & 40	335	336.4 ACSR - 3 Phase	$67,000	3.0	$201,000	$201,000				$201,000
Logan II - 449	336	#2 ACSR -1 Phase	$23,290	1.4	$32,606				$32,606	$32,606
Jericho - 541, 444, 446 & 731	337	336.4 ACSR - 3 Phase	$71,770	2.5	$179,425			$179,425		$179,425
Jericho - 931	338	#2 ACSR -2 Phase	$35,480	0.9	$31,932				$31,932	$31,932
Bekaert II - Katayama Feed	339	4/0 Cond. - 3 Phase	$75,000	1.8	$135,000			$135,000		$135,000
		TOTAL CODE 300:		95.1	$4,031,184	$996,400	$1,737,345	$669,937	$627,502	$4,031,184

CARRYOVER ITEMS

MISCELLANEOUS DISTRIBUTION EQUIPMENT - RUS CODE 600'S

ITEM	RUS CODE	4 YR. AVE. COST	# ITEMS		EXT. COST	2005	2006	2007	2008	TOTAL
New Transformers	601	$896	1840		$1,647,720	$391,000	$404,800	$418,600	$433,320	$1,647,720
New Meters	601	$68	2000		$136,500	$32,500	$33,500	$34,500	$36,000	$136,500
Service Upgrades	602	$1,370	180		$246,510	$58,500	$60,525	$62,640	$64,845	$246,510
Sectionalizing	603				$400,000	$100,000	$100,000	$100,000	$100,000	$400,000
Voltage Regulators	604				$238,910	$144,200	$71,210	$23,500	$0	$238,910
Pole Changes (Including Clearance)	606	$1,475	1040		$1,534,000	$364,000	$377,000	$390,000	$403,000	$1,534,000
		TOTAL								
		MISC. CODE 600'S:			$4,203,640	$1,090,200	$1,047,035	$1,029,240	$1,037,165	$4,203,640

OTHER DIST. ITEMS - RUS CODE 700

ITEM	RUS CODE	4 YR. AVE. COST	# ITEMS		EXT. COST	2005	2006	2007	2008	TOTAL
Security Lights	702	$421	680		$286,450	$68,000	$70,380	$72,760	$75,310	$286,450
		TOTAL CODE 700:								$286,450

2005-2009 Kentucky 30 - Shelby **CONSTRUCTION WORK PLAN TOTAL:** **$13,771,274**

DISTRIBUTION SYSTEM DESIGN CRITERIA

1) The minimum voltage on primary distribution lines is 118 volts (120 volt base, 126 volts at source) after re-regulation.

2) Primary conductors are not to be loaded over 75% of their thermal rating.

3) The following equipment will not be thermally loaded by more than the percentage shown:
   a) Distribution Transformers 130% winter; 100% summer
   b) Voltage Regulators 130% winter; 100% summer
   c) Step Voltage Transformers 130% winter; 100% summer
   d) Reclosers and Fuses 80% winter; 80% summer

4) Conversions to multiphase are to correct voltage drop and phase balance. Line sections operating at 12.5/7.2 kV with load currents exceeding 45 amps will be considered for multiphasing. 24.9/14.4 kV lines with load currents exceeding 40 amps will be considered for multiphasing. Line sections with greater than 60 customers will be considered for multiphasing. Operation and engineering practices used to develop the loading criteria are based on a single phase line interruption that may cause an operation of the ground trip relay on three phase oil circuit reclosers.

5) Three phase tie points between substations should be equipped with air break switches.

6) Conductors and associated poles and hardware will be considered for replacement on a priority basis as defined below:

   1. Replace all 8 ACWC.
   2. Replace 6 ACWC and #4 ACSR.
   3. URD cable as needed.

DISTRIBUTION LINE AND EQUIPMENT COSTS

Construction cost estimates for the four year planning period are shown in Table II-B-1. Cost summaries for distribution equipment are shown in Table II-B-2.

Table II-B-1
Line Construction Cost Estimates
Annual Projected Dollars/Mile

SIZE	TYPE	2005	2006	2007	2008
#2 ACSR	NEW 3-PH	$40,000	$41,400	$42,850	$44,350
1/0 ACSR	NEW 3-PH	$43,000	$44,500	$46,000	$47,600
4/0 ACSR	NEW 3-PH	$54,000	$55,890	$57,850	$59,870
336.4 ACSR	NEW 3-PH	$64,000	$66,240	$68,550	$70,950
#2 ACSR	CONV 3-PH	$42,000	$43,470	$45,000	$46,560
1/0 ACSR	CONV 3-PH	$45,000	$46,575	$48,200	$49,900
4/0 ACSR	CONV 3-PH	$57,000	$59,000	$61,050	$63,200
336.4 ACSR	CONV 3-PH	$67,000	$69,350	$71,770	$74,280
#2 ACSR	CONV V-PH	$32,000	$33,120	$34,320	$35,480
336.4 ACSR	CON DC 3-PH	$120,000	$124,200	$128,550	$133,050
#2 ACSR	NEW 1-PH	$26,500	$27,430	$28,390	$29,380
#2 ACSR	CONV 1-PH	$21,000	$21,730	$22,500	$23,290
1/0 ACSR	CONV 1-PH	$26,000	$26,910	$27,850	$28,830
1/0 ALUG	REPL 1-PH	$58,000	$60,000	$62,100	$64,300
1/0 ALUG	REPL 3-PH	$160,000	$165,600	$171,400	$177,400

Table II-B-2
Distribution Equipment Cost Estimates
Annual Projected Unit Costs

DEVICE	TYPE	2005	2006	2007	2008
V.Regulators (3)	100 amp	$32,800	$33,950	$35,140	$36,370
V.Regulators (3)	150 amp	$36,000	$37,260	$38,560	$39,900
V.Regulators (3)	219 amp	$39,300	$40,680	$42,100	$43,570
V.Regulators (1)	100 amp	$10,930	$11,310	$11,700	$12,100
300 kVAR Capacitors	3-ph w/ cont.	$2,100	$2,165	$2,250	$2,325
600 kVAR Capacitors	3-ph w/ cont.	$2,200	$2,280	$2,360	$2,440
Reclosers	3-ph Elect.	$21,000	$21,740	$22,500	$23,280
Reclosers	1-ph OCR	$2,400	$2,500	$2,600	$2,700

STATUS OF PREVIOUS CWP ITEMS

All projects from the 2001-2004 CWP have been completed except the following items.

740 C #	Project Description	Status
315	Section 477 2-ph #2 ACSR	Carryover 303.
316	Section 473, V-ph #2 ACSR	Carryover 304.
317	Section 476 1-ph #2 ACSR	Carryover 305.
320	Section 489, 1-ph #2 ACSR	Carryover 306.
322	Section 393, V-ph #2 ACSR	Carryover 316.
326	Section 341, 1-ph #2 ACSR	Carryover 317.
327	Section 364, 1-ph #2 ACSR	Carryover 318.
328	Section 757, 1-ph #2 ACSR	Carryover 319.
363	Cedarmore, 3-ph 1/0 URD	Deleted.
365	Section 366, 1-ph #2 ACSR	Carryover 321.
332	Section 232, #2 CU Rehab	Carryover 326.
333	Section 150, #2 CU Rehab	Carryover 327.
334	Section 234, #2 CU Rehab	Carryover 328.
348	Section 506, 1-ph #2 ACSR	Carryover 332.
357	Section 449, 1-ph #2 ACSR	Carryover 336.

ANALYSIS OF 1999-2018 LONG RANGE PLAN

The current Long Range Plan (LRP) projects a peak of 124 MW for the winter of 2008/2009. The loading level of 117 MW for the 2008/2009 construction work plan peak is in basic agreement with the LRP. The 124 MW LRP loading was selected to fully stress the system for long-range planning purposes. The 117 MW CWP load level was selected using a more moderate weather forecast.

The LRP preferred plan projects the ***Todd's Point Substation*** just after the CWP period. The ***Long Run*** substation, was energized in the summer of 2000 and will defer the construction of a substation at Todd's Point for a number of years past the CWP planning period.
There are no new substations required in the 2005-2009 CWP period. A new substation at Defoe has been deferred by double circuiting a feeder line heading southeast from the New Castle Substation.

Continued conductor replacement is scheduled in the LRP. This CWP report recommends and outlines an ongoing conductor replacement program.

In ***summary,*** the 2005-2009 Construction Work Plan is in basic agreement with the current LRP.

OPERATIONS & MAINTENANCE SURVEY

The current O&M Survey ("Review Rating Summary") was completed in July 2002.

SECTIONALIZING STUDIES

A sectionalizing study analyzes the existing overcurrent protection scheme and proposes changes to improve the overall effectiveness of the scheme.
Sectionalizing studies take place on a substation-by-substation basis.

The four main goals of a sectionalizing study are Safety, Reliability, Coordination, and Protection.

1. Safety – Sectionalizing devices should be able to detect and interrupt the full range of fault currents available in their zone of protection coverage. Calculated minimum fault current values (Using RUS Bulletin 61-2) should be detected and cleared by the protective device.

2. Reliability – Limit the outage hours per consumer by isolating or "sectionalizing" faulted portions of the circuit so that the minimum number of customers are interrupted. Additional devices – where needed – will further limit the overall outage hours.

3. Coordination – Good protective device coordination will ensure that the closest device to the fault opens. Fault locating is also enhanced. Miscoordination of protective devices can cause confusion and ultimately add to outage times.

4. Protection – A well designed protection scheme will minimize damage to the distribution system by limiting the time that damaging overcurrent is present on the faulted portion of the system.

Changes that can affect the coordination scheme include: load growth; substation transformer capacity increases; reconductoring distribution lines; single-phase to three-phase conversions; changes in the system's circuit configuration; and the addition of loads in specific locations.

The ongoing, substation-by-substation sectionalizing study will coincide with the construction projects in the CWP report. General sectionalizing device cost projections will be listed in the "603" category in this report.

Substation Loading

TABLE II-E-1 **HISTORY & FORECAST**

SUBSTATION/BASE KVA	KVA CAPACITY	Jan-05	Aug-04	%LOAD 2005	Jan-09	%LOAD 1/09
Bedford/11200	18144	9122	6751	50.28	11511	63.44
Bekaert #1/14000	**13620**	9334	11425	**83.88**	9508	52.41
Bekaert #2/11200	**13620**	5922	6094	**44.74**	9702	53.47
Blue Grass Tie*	---	370	348	---	0	---
Budd/11200	**13620**	7278	9336	**68.55**	9197	67.53
Campbellsburg11200	18144	10484	8067	57.78	11475	63.24
Clay Village/11200	18144	12033	9418	66.32	13005	71.68
Jericho/11200	15720	9836	6680	62.57	12666	80.57
Logan #1/14000	**13620**	6211	5198	**38.16**	7692	42.39
Logan #2/14000	**13620**	6924	5445	**39.98**	7920	43.66
Long Run/5600	**5540**	3357	3300	**59.57**	4210	53.56
Milton/11200	15720	4768	3215	30.33	6882	43.78
New Castle/11200	15720	6787	5483	43.17	9612	61.15
Southville/11200	15720	5630	4892	35.81	7018	44.64

SUMMER RATINGS IN GREEN

*Emergency Backfeed

SERVICE RELIABILITY

The record of SEC's service interruptions for the past five years is shown in Table II-E-2. The five-year average outage hours per consumer were **3.22**. An average of five hours per consumer per year is generally considered to be an indication of good reliability by RUS.

TABLE II-E-2

	Power Supplier	Extreme Storm	Prearranged	All Other	Total
2000 OUTAGE HR/CONS	0.73	0.00	0.03	2.92	3.68
2001 OUTAGE HR/CONS	0.23	0.96	0.07	2.02	3.28
2002 OUTAGE HR/CONS	0.19	0.00	0.03	1.39	1.61
2003 OUTAGE HR/CONS	0.23	2.27	0.01	1.05	3.56
2004 OUTAGE HR/CONS	0.02	2.89	0.04	1.04	3.99
FIVE YEAR AVE. OUTAGE HR/CONS	0.28	1.22	0.04	1.68	3.22

ADEQUACY OF DATA

The following is a list of the basic data used for this analysis and report.

1. Updated primary map indicating the following items:
   a) Substations with present feeder configurations.
   b) All open points.

2. Monthly substation non-coincident peak(NCP) demands for the past year and annual system peaks as listed in the Load Forecast.

3. Billing system kW and kWh sales for last winter and summer peaks.

4. 2004 East Kentucky Power Cooperative/SEC *Load Forecast.*

5. Five Year Outage Summary.

6. RUS Form 7 data.

7. Substation transformer ratings.

8. Load projections for each existing and proposed substation covering the summer and winter peak demands.

9. Substation Data Sheets.

10. Windmil circuit model databases with voltage drop calculations for each line section.

BASIC DATA AND ASSUMPTIONS

Design Load – The construction program in the CWP covers a four year period to serve the 117 MW, January 2009 winter peak. The design load was derived after reviewing the 2004 Load Forecast with the GFR.

Load Allocation – Individual substations were grown at similar rates. The total system design load was attained by allocating each substation's load to its individual line sections proportional to the number of consumers and the kWh consumption on each of the line sections. Peak summer and peak winter loading were modeled and analyzed. The system is generally winter peaking with the exception of the industrial load in the Shelbyville Industrial Park area and the Long Run residential area.

Voltage Drop – For the design load, an eight volt drop with one set of downline voltage regulators was assumed to be the maximum allowable drop from the substation to the end of the distribution feeder.

Substation Voltage Regulation – Voltage regulation was assumed for each substation such that a 10% voltage drop could be experienced on the transmission system at peak load and 126 volts could still be supplied to the substation bus.

System Power Factor – System power factor values were reviewed from the East Kentucky Power Substation Reports. Power factor values for each substation were within acceptable levels.

Single-Phase Loading – On taps where more than (*a 7.2 kV load of 325 kW or a 14.4 kV load of 575 kW*) is served from a single-phase line, conversion to 2 or 3 phase was considered in order to provide greater system reliability. Two-phase conversions were generally chosen where a single-phase line split into two taps – with a large amount of load being present on only one of the taps. Three-phase conversions were chosen for the more heavily loaded taps and when the single- phase tap split into more than two directions.

Inflation – An annual inflation rate of 3.5% was used in this CWP.

Construction Cost Estimates – Cost estimates for the various distribution equipment and conductor sizes are presented in Tables II-B-1 and II-B-2.

Computer Model of Distribution System – The system is modeled on Milsoft Integrated Solution's Windmil analysis software. Downloading monthly billing computer data into the Windmil billing file directory was the framework for building the winter and summer models. Projected models were analyzed for Design Criteria violations.

Economic Conductor Analysis – Economic Conductor analysis includes the consideration of initial construction costs and the associated losses of the selected conductors. For two alternative conductors compared, there is generally a kW load level at which the fixed costs associated with construction plus the variable costs related to line losses are equal for both alternatives.

The following general recommendations were generated from the analysis:

1. New single phase line extensions should be constructed of #2 ACSR.
2. Conversions that are to remain single-phase should generally be constructed of #2 ACSR.
3. Converted 25 kv three-phase construction should be of #2 ACSR for initial loads of less than 1,700 kW; 1/0 ACSR for initial loads of 1700 kW – 3,700 kW; 336.4 ASCR for initial loads of greater than 3,700 kW.
4. Converted 12.5 kv three-phase construction should be of #2 ACSR for initial loads of less than 900 kW; 1/0 ACSR for initial loads of 900 kW – 1,900 kW; and 336.4 ACSR for initial loads greater than 1,900 kW.

The data tables preceeding each analysis graph lists the assumptions that were made in each scenario of the conductor analysis. This analysis appears in the Appendices of this report.

FINANCIAL DATA

- ***Cost of Capital = 5.50%***
- ***Inflation = 3.5%***
- ***Increase in Cost of Power = 2.0%***
- ***Present Worth Discount Factor = 5.50%***
- ***Depreciation = 2.84%***
- ***O & M = 5.19%***
- ***Tax & Insurance = 0.27%***

TABLE III-B-1
COST SUMMARY DATA (3.5% Annual Inflation)

DESCRIPTION	ACTUAL 24 mo.	2005	2006	2007	2008	CWP TOTAL
New Member Extensions (100)						
1. New services constructed	985	500	500	500	500	2000
2. Cost per Customer	$2,624	$2,500	$2,575	$2,665	$2,760	
3. Cost of New Customers	$2,584,640	$1,250,000	$1,287,500	$1,332,500	$1,380,000	$5,250,000
4. Average Extension Footage	450	450	450	450	450	
5. Total Extension Footage		225000	225000	225000	225000	900000
New Transformers (601)						
1. New transformers added	905	460	460	460	460	1840
2. Cost per Transformer	$825	$850	$880	$910	$942	
3. Cost of New Transformers	$746,625	$391,000	$404,800	$418,600	$433,320	$1,647,720
New Meters (601)						
1. New Meters added	985	500	500	500	500	2000
2. Cost per Meter	$65	$65	$67	$69	$72	
3. Cost of New Meters	$64,025	$32,500	$33,500	$34,500	$36,000	$136,500
Service Upgrades (602)						
1. Number of Service Upgrades	87	45	45	45	45	180
2. Cost per Service Upgrade	$1,300	$1,300	$1,345	$1,392	$1,441	
3. Cost of Service Upgrades	$113,100	$58,500	$60,525	$62,640	$64,845	$246,510
Pole Changes - Replacement (606)*						
1. Poles Changed	320	260	260	260	260	1040
2. Cost per Pole Change	$1,400	$1,400	$1,450	$1,500	$1,550	
3. Cost of Pole Changes	$448,000	$364,000	$377,000	$390,000	$403,000	$1,534,000
Security Lights (702)						
1. New Security Lights Added	330	170	170	170	170	680
2. Cost per Security Light	$400	$400	$414	$428	$443	
3. Cost of Security Lights	$132,000	$68,000	$70,380	$72,760	$75,310	$286,450

*- Pole Treatment Program Underway

SERVICE TO NEW CUSTOMERS – RUS CODE 100

A total of 2,000 new services are anticipated. The projected cost is $5,250,000.

Cost history and projections are shown in Table III-B-1.

SYSTEM IMPROVEMENTS – RUS CODE 300

LINE CONVERSION NARRATIVES

Logan I Substation
Code 301
Estimated Cost: $39,900
Year: 2005

Description of Proposed Construction
Section 486 - Replace 1.9 miles of single-phase #4 ACSR with single-phase #2 ACSR along Pounds Lane.

Reason For Proposed Construction
The aged conductor (Design Criteria Item 6) is responsible for unreliable service in the area.

Results of Proposed Construction
Service reliability will be improved.

Alternative Corrective Plan Investigated
No alternatives were considered due to the aged conductor.

Logan I Substation
Code 302
Estimated Cost: $37,264
Year: 2008

Description of Proposed Construction
Section 430 - Replace 1.6 miles of single-phase #4 ACSR with single-phase #2 ACSR along Reeds Lane.

Reason For Proposed Construction
The aged conductor (Design Criteria Item 6) is responsible for unreliable service in the area.

Results of Proposed Construction
Service reliability will be improved.

Alternative Corrective Plan Investigated
No alternatives were considered due to the aged conductor.

SYSTEM IMPROVEMENTS – RUS CODE 300

Logan I Substation (continued)

Code 303 Carryover
Estimated Cost: $32,000
Year: 2005

Description of Proposed Construction
Section 477 - Convert 1.0 mile of single-phase #4 ACSR to two-phase #2 ACSR along Figgs Store Road.

Reason For Proposed Construction
Design Criteria Item 4 is being violated. The aged conductor is responsible for unreliable service in the area.

Results of Proposed Construction
Single-phase overloading will be relieved. Service reliability will be improved.

Alternative Corrective Plan Investigated
No alternatives were considered due to the aged conductor.

Logan I Substation

Code 304 Carryover
Estimated Cost: $19,200
Year: 2005

Description of Proposed Construction
Section 473 - Convert 0.6 mile of single-phase #4 ACSR to two-phase #2 ACSR along Locust Grove Road.

Reason For Proposed Construction
Design Criteria Item 4 is being violated. The aged conductor is responsible for unreliable service in the area.

Results of Proposed Construction
Single-phase overloading will be relieved. Service reliability will be improved.

Alternative Corrective Plan Investigated
No alternatives were considered due to the aged conductor.

SYSTEM IMPROVEMENTS – RUS CODE 300

Logan I Substation (continued)

Code 305 Carryover
Estimated Cost: $44,100
Year: 2005

Description of Proposed Construction
Section 476 – Replace 2.1 miles of single-phase #4 ACSR with single-phase #2 ACSR along Donahue and Haley Roads.

Reason For Proposed Construction
The aged conductor (Design Criteria Item 6) is responsible for unreliable service in the area.

Results of Proposed Construction
Service reliability will be improved.

Alternative Corrective Plan Investigated
No alternatives were considered due to the aged conductor.

Logan I Substation

Code 306 Carryover
Estimated Cost: $96,000
Year: 2005

Description of Proposed Construction
Section 489- Convert 3.0 miles of single-phase #4 ACSR to two-phase #2 ACSR along KY 148 West.

Reason For Proposed Construction
Design Criteria Item 4 is being violated. The aged conductor is responsible for unreliable service in the area.

Results of Proposed Construction
Single-phase overloading will be relieved. Service reliability will be improved.

Alternative Corrective Plan Investigated
No alternatives were considered due to the aged conductor.

SYSTEM IMPROVEMENTS – RUS CODE 300

Clayvillage Substation

Code 307

Estimated Cost: $83,250
Year: 2007

Description of Proposed Construction
Sections 360,357-359 – Replace 3.7 miles of single-phase #4 ACSR with single-phase #2 ACSR along Elmburg Road and Taylor-Bright Road.

Reason For Proposed Construction
The aged conductor (Design Criteria Item 6) is responsible for unreliable service in the area.

Results of Proposed Construction
Service reliability will be improved.

Alternative Corrective Plan Investigated
No alternatives were considered due to the aged conductor.

Clayvillage Substation

Code 308

Estimated Cost: $200,273
Year: 2006

Description of Proposed Construction
Sections 396, 896, 398 & 400 – Convert 4.3 miles of single-phase #4 ACSR to three-phase 1/0 ACSR along Vigo Road.

Reason For Proposed Construction
The aged conductor is producing unreliable service and Design Criteria item 4 is being violated.

Results of Proposed Construction
Service reliability will be improved and single-phase overloading will be relieved.

Alternative Corrective Plan Investigated
No alternative was considered due to the aged conductor.

SYSTEM IMPROVEMENTS – RUS CODE 300

Clayvillage Substation (continued)

Code 309

Estimated Cost: $39,114
Year: 2006

Description of Proposed Construction
Sections 397 & 399 – Replace 1.8 miles of single-phase #4 ACSR with single-phase #2 ACSR along Elmburg Road and Harley Thompson Road.

Reason For Proposed Construction
The aged conductor (Design Criteria Item 6) is responsible for unreliable service in the area.

Results of Proposed Construction
Service reliability will be improved.

Alternative Corrective Plan Investigated
No alternatives were considered due to the aged conductor.

Clayvillage Substation

Code 310

Estimated Cost: $93,300
Year: 2007

Description of Proposed Construction
Section 422 – Convert 1.3 miles of three-phase #2 ACSR to three-phase 336.4ACSR underbuild from Clayvillage Substation south to US 60.

Reason For Proposed Construction
The section is experiencing overloading. Design Criteria (DC) items 1 & 4 are being violated.

Results of Proposed Construction
Overloading and voltage drop problems will be corrected.

Alternative Corrective Plan Investigated
No alternatives were considered.

SYSTEM IMPROVEMENTS – RUS CODE 300

Clayvillage Substation (continued)

Code 311
Estimated Cost: $65,208
Year: 2007

Description of Proposed Construction
Section 361 – Convert 1.9 miles of single-phase #4 ACSR to two-phase #2 ACSR from Catwalk Rd northwest along Jacksonville Road.

Reason For Proposed Construction
The aged conductor is producing unreliable service and Design Criteria item 4 is being violated.

Results of Proposed Construction
Service reliability will be improved and single-phase overloading problems will be corrected.

Alternative Corrective Plan Investigated
No alternatives were considered since the aged conductor is in need of replacing.

Clayvillage Substation

Code 312
Estimated Cost: $51,238
Year: 2008

Description of Proposed Construction
Sections 313 & 314 – Replace 2.2 miles of single-phase #4 ACSR with single-phase #2 ACSR at HWY 421 near Union Church Road.

Reason For Proposed Construction
The aged conductor (Design Criteria Item 6) is responsible for unreliable service in the area.

Results of Proposed Construction
Service reliability will be improved.

Alternative Corrective Plan Investigated
No alternatives were considered due to the aged conductor.

SYSTEM IMPROVEMENTS – RUS CODE 300

Clayvillage Substation (continued)

Code 313
Estimated Cost: $34,768
Year: 2006

Description of Proposed Construction
Section 309 – Replace 1.6 miles of single-phase #4 ACSR with single-phase #2 ACSR along Scrabble Road.

Reason For Proposed Construction
The aged conductor (Design Criteria Item 6) is responsible for unreliable service in the area.

Results of Proposed Construction
Service reliability will be improved.

Alternative Corrective Plan Investigated
No alternatives were considered due to the aged conductor.

Clayvillage Substation

Code 314
Estimated Cost: $189,000
Year: 2005

Description of Proposed Construction
Sections 625, 419 & 420 – Convert 4.2 miles of three-phase 6ACWC to three-phase 1/0 ACSR southeast along Hempridge Road.

Reason For Proposed Construction
Design Criteria Items 1 & 6 are responsible for unreliable service in the area.

Results of Proposed Construction
Voltage levels and service reliability problems will be relieved.

Alternative Corrective Plan Investigated
Regulators were not considered due to the aged copper conductor needing replacement.

SYSTEM IMPROVEMENTS – RUS CODE 300

Clayvillage Substation (continued)

Code 315
Estimated Cost: $54,912
Year: 2007

Description of Proposed Construction
Section 345 – Convert 1.6 miles of single-phase #4 ACSR to two-phase #2 ACSR from Stony Point Road to Eminence Pike.

Reason For Proposed Construction
The section is experiencing single-phase overloading. Design Criteria (DC) items 1 & 4 are being violated.

Results of Proposed Construction
Voltage drop problems and single-phase overloading will be corrected.

Alternative Corrective Plan Investigated
This line is radial so no back feeds were available to consider relieving the single-phase overloading.

Clayvillage Substation

Code 316 Carryover
Estimated Cost: $20,592
Year: 2007

Description of Proposed Construction
Section 393– Convert 0.6 miles of single-phase #4 ACSR to two-phase #2 ACSR along Christianburg Road.

Reason For Proposed Construction
The section is experiencing single-phase overloading. Design Criteria (DC) items 1 & 4 are being violated.

Results of Proposed Construction
Voltage drop problems and single-phase overloading will be corrected.

Alternative Corrective Plan Investigated
No viable back feeds were available to consider relieving the single-phase overloading.

SYSTEM IMPROVEMENTS – RUS CODE 300

Clayvillage Substation (continued)

Code 317 Carryover
Estimated Cost: $38250
Year: 2007

Description of Proposed Construction
Section 341 – Replace 1.7 miles of single-phase #4 ACSR with single-phase #2 ACSR along Moody Pike.

Reason For Proposed Construction
The aged conductor (Design Criteria Item 6) is responsible for unreliable service in the area.

Results of Proposed Construction
Service reliability will be improved.

Alternative Corrective Plan Investigated
No alternatives were considered due to the aged conductor.

Clayvillage Substation

Code 318 Carryover
Estimated Cost: $58,225
Year: 2008

Description of Proposed Construction
Section 364 – Replace 2.5 miles of single-phase #4 ACSR with single-phase #2 ACSR along Elmburg Road.

Reason For Proposed Construction
The aged conductor (Design Criteria Item 6) is responsible for unreliable service in the area.

Results of Proposed Construction
Service reliability will be improved.

Alternative Corrective Plan Investigated
No alternatives were considered due to the aged conductor.

SYSTEM IMPROVEMENTS – RUS CODE 300

Clayvillage Substation (continued)

Code 319 Carryover

Estimated Cost: $26,076
Year: 2006

Description of Proposed Construction

Section 757 – Replace 1.2 miles of single-phase #4 ACSR with single-phase #2 ACSR along Bob Rogers Road.

Reason For Proposed Construction

The aged conductor (Design Criteria Item 6) is responsible for unreliable service in the area.

Results of Proposed Construction

Service reliability will be improved.

Alternative Corrective Plan Investigated

No alternatives were considered due to the aged conductor.

SYSTEM IMPROVEMENTS – RUS CODE 300

Clayvillage Substation (continued)

Code 321 Carryover
Estimated Cost: $73,882
Year: 2006

Description of Proposed Construction
Section 366 – Replace 3.4 miles of single-phase #4 ACSR with single-phase #2 ACSR along Hatton Road.

Reason For Proposed Construction
The aged conductor (Design Criteria Item 6) is responsible for unreliable service in the area.

Results of Proposed Construction
Service reliability will be improved.

Alternative Corrective Plan Investigated
No alternatives were considered due to the aged conductor.

New Castle Substation

Code 322
Estimated Cost: $745,200
Year: 2006

Description of Proposed Construction
Sections 303, 291, 293 & 294 - Convert 6.0 miles of three-phase #2 ACSR to Double-Circuit three-phase 336.4 ACSR from New Castle Substation to Bethlehem along HWY 573.

Reason For Proposed Construction (Presently Served by Blue Grass Energy Coop)
The Bluegrass Energy Tie is unreliable in the least of storm conditions. The extremely long feed is from the (Blue Grass) Bridgeport Substation in Franklin County. Clayvillage feeders 2 & 3 are experiencing end-of-line voltage drop and excessive amperage loading, in violation of Design Criteria Items 1 & 4.

Results of Proposed Construction
Voltage drop and loading problems will be corrected. The reliability into the southeastern portion of Henry County will greatly be improved.

Alternative Corrective Plan Investigated
Construction of a substation at Defoe and an upgrade coming north out of the Clayvillage Substation were considered, but were more expensive.

SYSTEM IMPROVEMENTS – RUS CODE 300

New Castle Substation (continued)

Code 323
Estimated Cost: $235,790
Year: 2006

Description of Proposed Construction
Sections 284-287 & 289 – Convert 3.4 miles of single-phase #4 ACSR to three-phase 336.4 ACSR from Razor Lane to HWY 421 into Defoe.

Reason For Proposed Construction (Presently Served by Blue Grass Energy Coop)
The Bluegrass Energy Tie is unreliable in the least of storm conditions. The extremely long feed is from the (Blue Grass) Bridgeport Substation in Franklin County. Clayvillage feeders 2 & 3 are experiencing end-of-line voltage drop and excessive amperage loading, in violation of Design Criteria Items 1 & 4.

Results of Proposed Construction
Voltage drop and loading problems will be corrected. The reliability into the southeastern portion of Henry County will greatly be improved.

Alternative Corrective Plan Investigated
Construction of a substation at Defoe and an upgrade coming north out of the Clayvillage Substation were considered, but were more expensive.

New Castle Substation

Code 324
Estimated Cost: $181,643
Year: 2006

Description of Proposed Construction
Sections 306, 308, 929 & 830 – Convert 3.9 miles of single-phase #4 ACSR to three-phase 1/0 ACSR along HWY 573 to Harper's Ferry.

Reason For Proposed Construction
The Bluegrass Energy Tie is unreliable in the least of storm conditions. Design Criteria Items 1 & 6 are being violated.

Results of Proposed Construction
The reliability into the southeastern portion of Henry County will greatly be improved.

Alternative Corrective Plan Investigated
Construction of a substation at Defoe and an upgrade coming north out of the Clayvillage Substation were considered. This project was required no matter which alternative was chosen.

SYSTEM IMPROVEMENTS – RUS CODE 300

Campbellsburg Substation (continued)

Code 325 Carryover
Estimated Cost: $88,500
Year: 2008

Description of Proposed Construction
Sections 220 & 221 – Replace 3.8 miles of single-phase #4 ACSR with single-phase #2 ACSR across Mill Creek around to Long Branch Road.

Reason For Proposed Construction
The aged conductor (Design Criteria Item 6) is responsible for unreliable service in the area.

Results of Proposed Construction
Service reliability will be improved.

Alternative Corrective Plan Investigated
No alternatives were considered due to the aged conductor.

Campbellsburg Substation

Code 326 Carryover
Estimated Cost: $43,200
Year: 2008

Description of Proposed Construction
Section 232 & 235 – Rehab 3.6 miles of three-phase #2 Copper along Feeder 1 to Providence.

Reason For Proposed Construction
The aged structures and conductors (Design Criteria Item 6) are responsible for unreliable service in the area.

Results of Proposed Construction
Service reliability will be improved.

Alternative Corrective Plan Investigated
A complete line conversion was a more costly alternative.

SYSTEM IMPROVEMENTS – RUS CODE 300

Campbellsburg Substation (continued)

Code 327 Carryover
Estimated Cost: $50,400
Year: 2008

Description of Proposed Construction
Section 150, 153, 154 & 158 – Rehab 4.2 miles of three-phase #2 Copper along Orem Lane.

Reason For Proposed Construction
The aged structures and conductors (Design Criteria Item 6) are responsible for unreliable service in the area.

Results of Proposed Construction
Service reliability will be improved.

Alternative Corrective Plan Investigated
A complete line conversion was a more costly alternative.

Campbellsburg Substation

Code 328 Carryover
Estimated Cost: $24,000
Year: 2008

Description of Proposed Construction
Section 234 – Rehab 2.0 miles of three-phase #2 Copper along Daughtery Creek Road.

Reason For Proposed Construction
The aged structures and conductors (Design Criteria Item 6) are responsible for unreliable service in the area.

Results of Proposed Construction
Service reliability will be improved.

Alternative Corrective Plan Investigated
A complete line conversion was a more costly alternative.

SYSTEM IMPROVEMENTS – RUS CODE 300

Bedford Substation

Code 329
Estimated Cost: $254,600
Year: 2005

Description of Proposed Construction
Sections 787, 89, 87 & 886 – Convert 3.8 miles of three-phase #4 ACSR to three-phase 336.4 ACSR at Bray's Ridge.

Reason For Proposed Construction
End of line voltage drop and service reliability (Design Criteria Items 1 & 6) have been problems in this area. A key water plant and continued growth make this a needed improvement.

Results of Proposed Construction
The reliability and system voltage will greatly be improved in this area.

Alternative Corrective Plan Investigated
The two other three-phase feeds into this area are already regulated and voltage-limited.

Bedford Substation

Code 330
Estimated Cost: $53,220
Year: 2008

Description of Proposed Construction
Section 115 – Convert 1.5 miles of single-phase #4 ACSR to two-phase #2 ACSR along New Hope Road feeding Devin Drive.

Reason For Proposed Construction
The section is experiencing overloading. Design Criteria (DC) item 4 is being violated.

Results of Proposed Construction
Overloading problems will be corrected.

Alternative Corrective Plan Investigated
There was no viable backfeed into this area.

SYSTEM IMPROVEMENTS – RUS CODE 300

Bedford Substation (continued)

Code 331
Estimated Cost: $120,600
Year: 2005

Description of Proposed Construction
Sections 190 & 628 – Convert 1.8 miles of three-phase #2 Copper to three-phase 336.4 ACSR from Rose Hill Road South on HWY 421 to Chandler Road.

Reason For Proposed Construction

End of line voltage drop and service reliability (Design Criteria Items 1 & 6) have been problems in this area.

Results of Proposed Construction
The reliability and system voltage will greatly be improved in this area Campbellsburg Feeder 4 will be relieved. Aged conductor will be replaced.

Alternative Corrective Plan Investigated
There were no other alternatives to relieve the loading on Feeder 4 out of the Campbellsburg Substation.

Southville Substation

Code 332 Carryover
Estimated Cost: $100,147
Year: 2008

Description of Proposed Construction
Section 506 – Replace 4.3 miles of single-phase #4 ACSR with single-phase #2 ACSR along Back Creek Road.

Reason For Proposed Construction
The aged conductor (Design Criteria Item 6) is responsible for unreliable service in the area.

Results of Proposed Construction
Service reliability will be improved.

Alternative Corrective Plan Investigated
No alternatives were considered due to the aged conductor.

SYSTEM IMPROVEMENTS – RUS CODE 300

Southville Substation (continued)

Code 333
Estimated Cost: $200,600
Year: 2006

Description of Proposed Construction
Sections 515 & 733 – Convert 3.4 miles of three-phase #4 ACSR to three-phase 4/0 ACSR along Woodlawn Road.

Reason For Proposed Construction
Design Criteria (DC) item 1 is being violated and aged conductor needs replacing.

Results of Proposed Construction
Voltage drop problems will be corrected.

Alternative Corrective Plan Investigated
Voltage regulators would not solve the aged conductor problem.

Southville Substation

Code 334
Estimated Cost: $56,770
Year: 2008

Description of Proposed Construction
Sections 505, 547 & 498 – Convert 1.6 miles of single-phase #2 ACSR to two-phase #2 ACSR from Back Creek Road south to Cat Ridge Road.

Reason For Proposed Construction
Design Criteria (DC) item 4 is being violated.

Results of Proposed Construction
Single-phase overloading will be relieved.

Alternative Corrective Plan Investigated
There were no alternate feeds available to relieve loading.

SYSTEM IMPROVEMENTS – RUS CODE 300

Milton Substation

Code 335
Estimated Cost: $201,000
Year: 2005

Description of Proposed Construction
Sections 12, 629, 36, 38 & 40 – Convert 3.0 miles of three-phase #4 ACSR to three-phase 336.4 ACSR south along Old Bedford-Milton Pike.

Reason For Proposed Construction
Design Criteria (DC) item 1 is being violated and aged conductor needs replacing. Bedford Feeder 1 needs loading relief.

Results of Proposed Construction
Voltage drop problems will be corrected and load will be shifted onto the newly upgraded Milton Substation and off of the Bedford Substation.

Alternative Corrective Plan Investigated
There were no other three-phase sources available to relieve the Bedford Feeder 1.

Logan II Substation

Code 336 Carryover
Estimated Cost: $32,606
Year: 2008

Description of Proposed Construction
Section 449 – Replace 1.4 miles of single-phase #4 ACSR with single-phase #2 ACSR along Hinkle Lane.

Reason For Proposed Construction
The aged conductor (Design Criteria Item 6) is responsible for unreliable service in the area.

Results of Proposed Construction
Service reliability will be improved.

Alternative Corrective Plan Investigated
No alternatives were considered due to the aged conductor.

SYSTEM IMPROVEMENTS – RUS CODE 300

Jericho Substation

Code 337

Estimated Cost: $179,425
Year: 2007

Description of Proposed Construction
Sections 541, 444, 446 &731 – Convert 2.5 miles of three-phase #4 ACSR to three-phase 336.4 ACSR on South HWY 322 at county line to Clore Jackson Road.

Reason For Proposed Construction
Design Criteria (DC) item 1 is being violated and aged conductor is in need of replacement.

Results of Proposed Construction
Voltage Drop problems will be relieved.

Alternative Corrective Plan Investigated
Voltage Regulators were not considered since aged conductor needed to be replaced.

SYSTEM IMPROVEMENTS – RUS CODE 300

Jericho Substation

Code 338

Estimated Cost: $31,932
Year: 2008

Description of Proposed Construction
Section 931 – Convert 0.9 mile of single-phase #4 ACSR to two-phase #2 ACSR along Radcliff Road.

Reason For Proposed Construction
Design Criteria (DC) item 4 is being violated and aged conductor needs replacing. Bedford Feeder 1 needs loading relief.

Results of Proposed Construction
Single-phase overload problems will be corrected.

Alternative Corrective Plan Investigated
The feed from the north could not relieve any load off of this section.

SYSTEM IMPROVEMENTS – RUS CODE 300

New Bekaert Substation

Code 339

Estimated Cost: $135,000
Year: 2007

Description of Proposed Construction
Extend the Walmart feeder by adding a third circuit of 4/0 conductor for 1.8 miles north along Ardmore Lane to the Katayama Plant.

Reason For Proposed Construction
The Katayama plant is expanding its operation which requires additional capacity.

Results of Proposed Construction
A more dedicated feed into this large operation will improve reliability of service. A more even load balance will be obtained on the two Bekaert Substations.

Alternative Corrective Plan Investigated
An on site substation may be considered if the load continues to grow rapidly in this area.

MISCELLANEOUS DISTRIBUTION EQUIPMENT – RUS CODE 600's

Meters and Transformers – RUS Code 601
Historical data was gathered for meters and transformers and is included in Table III-B-1.
2,000 new meters are projected at a cost of $136,500.
1,840 new transformers are projected at a cost of $1,647,720.

Service Upgrades – RUS Code 602
There are 180 service upgrades projected at a total cost of $246,510. Historical data is included in Table III-B-1.

Sectionalizing – RUS Code 603
Overcurrent analysis is performed on an ongoing basis. Device changeouts, conductor multiphasing and load shifts require overcurrent device purchases.
Oil circuit reclosers, fuses and switches are included in this category.
The total overall projected cost for sectionalizing is $400,000.

Voltage Regulators – RUS Code 604
Seven sets of voltage regulator upgrades are projected for the CWP as follows:

CFR CODE	SUBSTATION	SECT/RATING	YEAR	COST
604.1	CAMPBELLSBURG	147/ (3) 150 A	2006	$37,260
604.2	CAMPBELLSBURG	227/ (3) 219 A	2005	$39,300
604.3	CAMPBELLSBURG	197/ (3) 100 A	2005	$32,800
604.4	CLAYVILLAGE	370/ (2) 100 A	2007	$23,500
604.5	JERICHO	161/ (3) 219 A	2005	$39,300
604.6	NEW CASTLE	252/ (2) 100 A	2005	$32,800
604.7	NEW CASTLE	315/ (3) 100 A	2006	$33,950

Capacitor Banks – RUS Code 605
No capacitor banks are projected in the CWP

MISCELLANEOUS DISTRIBUTION EQUIPMENT – RUS CODE 600's (cont.)

Pole Changes – RUS Code 606 Including Clearance Poles

There are 1,040 projected pole changes in the CWP. This includes all maintenance and clearance poles. The cost for the pole changes is projected to be $1,534,000. Historical cost data for pole changes may be found in Table III-B-1. The projected number of poles is greater than the historical numbers due to the resumption of the pole inspection program.

RUS CODE 700

Security Lights – RUS Code 702
A total of 680 new security lights are anticipated. The projected cost is $286,450. Security light cost history and projections are shown in Table III-B-1.

APPENDICES

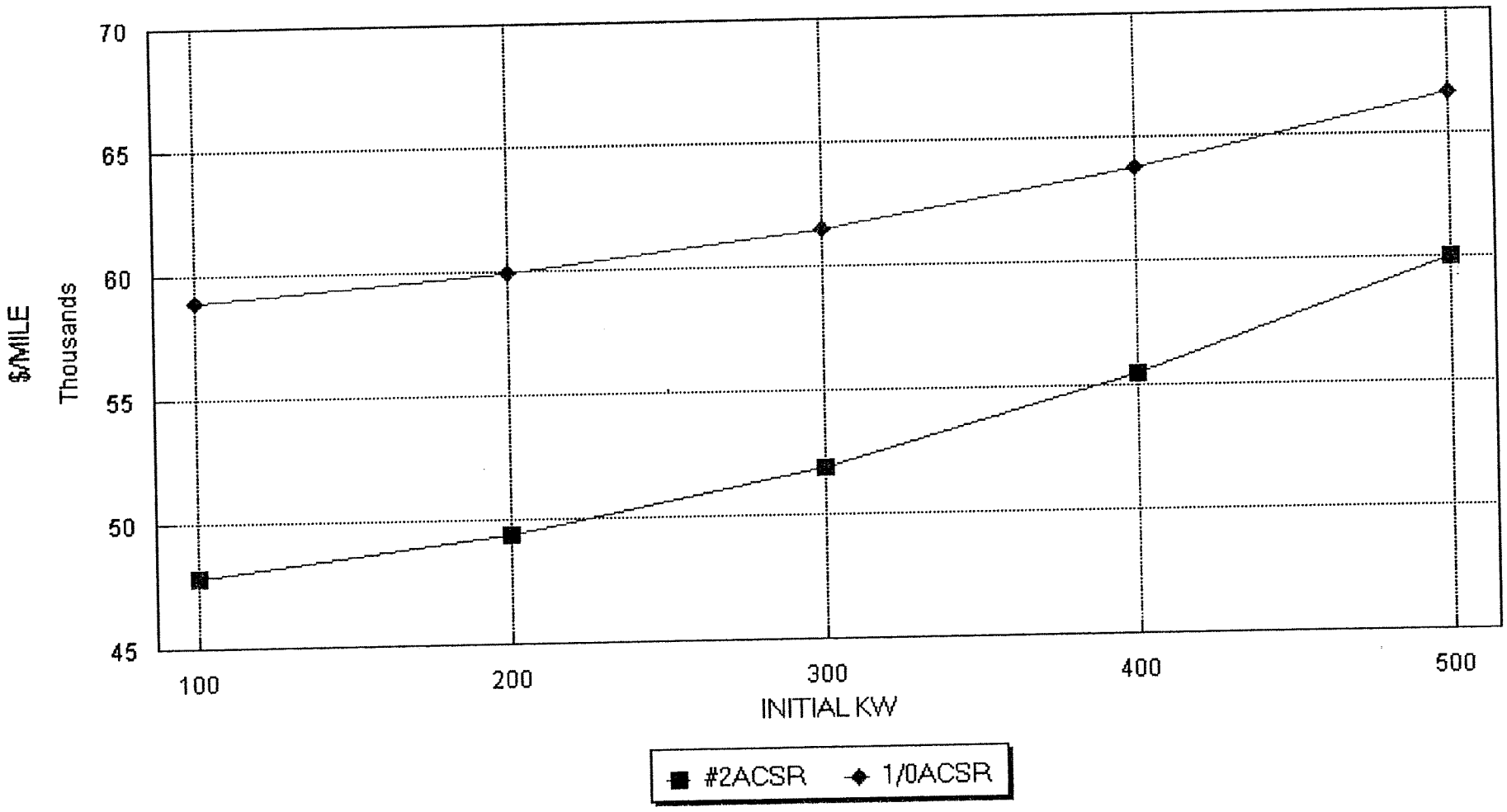
Shelby Energy Cooperative Inc.
12 kV 1-Phase
Economic Conductor Calculations

O&M/Dep.	TAX	INS	INT	$/KW	$/KWH	KW
5.19%	0.10%	0.17%	5.50%	5.39	0.022	100
RMO	RAT	KWI	KWHI	LGR	INF	m
12	0.0%	1.00%	1.00%	3.00%	3.50%	20
LF	PF	CF	N	KV	P	
50.0%	98.0%	93.0%	0.6325	7.2	1	

CONDUCTOR	2ACSR	1/0ACSR
COST/MI	$21,000	$26,000
OHMS/MI	1.420	0.900
TCOST/MI	$101,116	$124,592
PWCOST/MI	$47,849	$58,935

ECONOMIC CONDUCTOR CALCULATIONS

Shelby Energy 12 kV 1-Phase



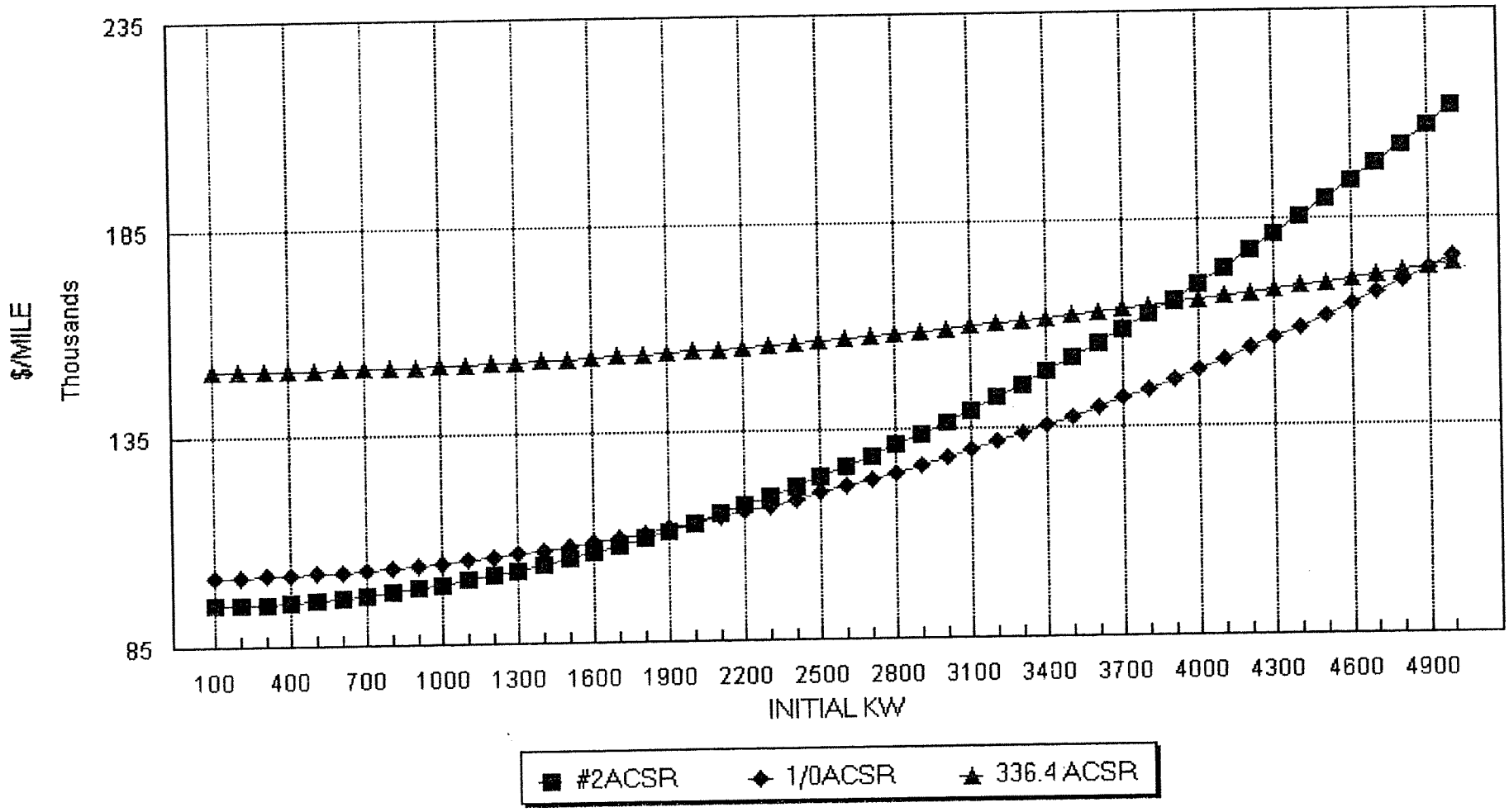
Shelby Energy Cooperative Inc.
25 kV 3-Phase
Economic Conductor Calculations

O&M/Dep.	TAX	INS	INT	$/KW	$/KWH	KW
5.19%	0.10%	0.17%	5.50%	5.39	0.022	500
RMO	RAT	KWI	KWHI	LGR	INF	m
12	0.0%	1.00%	1.00%	3.00%	3.50%	20
LF	PF	CF	N	KV	P	
55.0%	97.0%	90.0%	0.6325	14.4	3	

CONDUCTOR	2ACSR	1/0ACSR	336.4 ACSR
COST/MI	$42,000	$45,000	$67,000
OHMS/MI	1.420	0.900	0.278
TCOST/MI	$202,539	$216,004	$319,894
PWCOST/MI	$95,854	$102,189	$151,275

ECONOMIC CONDUCTOR CALCULATIONS

Shelby Energy 25 kV 3-Phase



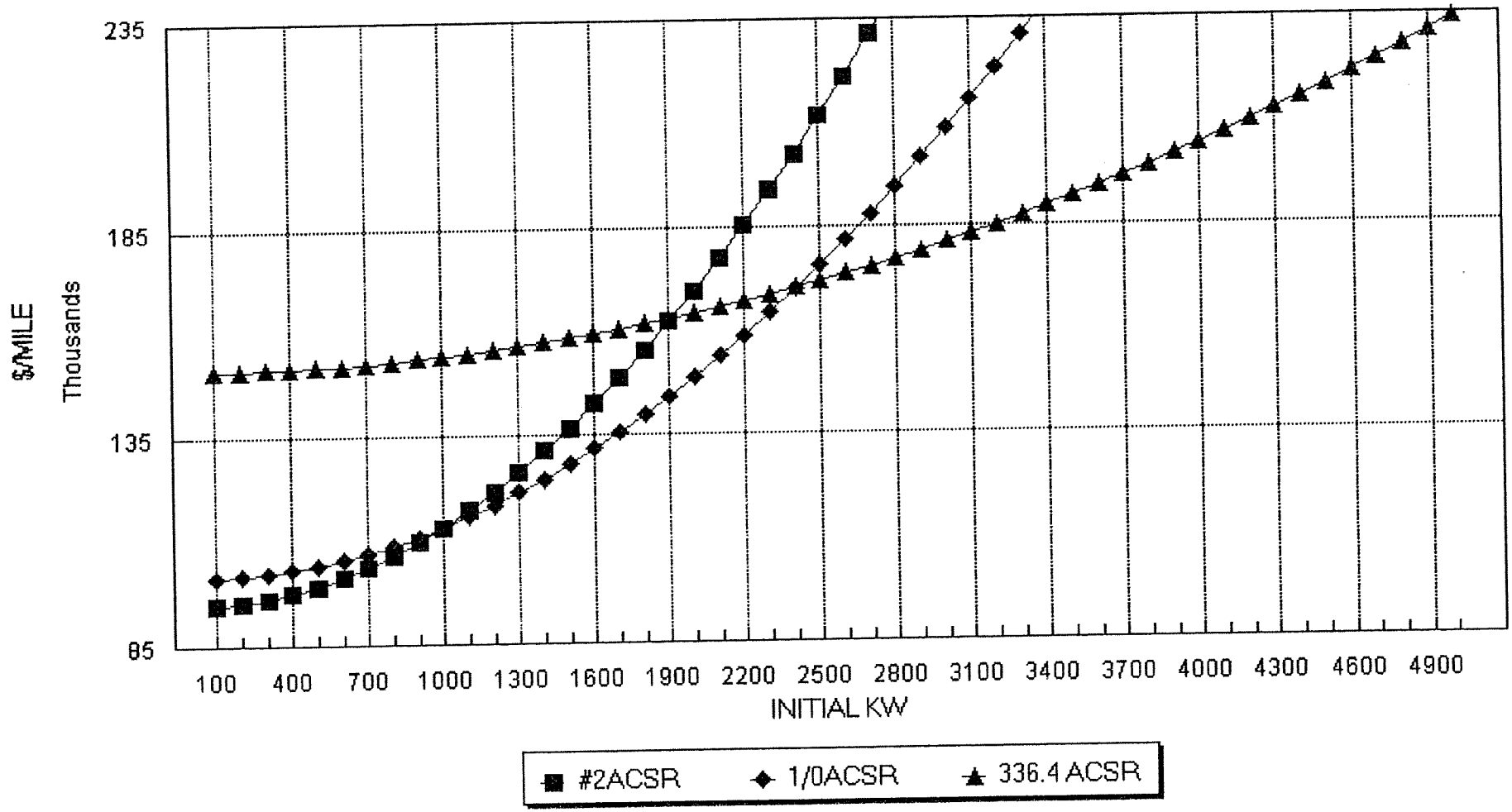
Shelby Energy Cooperative Inc.
12 kV 3-Phase
Economic Conductor Calculations

O&M/Dep.	TAX	INS	INT	$/KW	$/KWH	KW
5.19%	0.10%	0.17%	5.50%	5.39	0.022	500
RMO	RAT	KWI	KWHI	LGR	INF	m
12	0.0%	1.00%	1.00%	3.00%	3.50%	20
LF	PF	CF	N	KV	P	
55.0%	97.0%	90.0%	0.6325	7.2	3	

CONDUCTOR	2ACSR	1/0ACSR	336.4 ACSR
COST/MI	$42,000	$45,000	$67,000
OHMS/MI	1.420	0.900	0.278
TCOST/MI	$209,408	$220,358	$321,070
PWCOST/MI	$99,360	$104,412	$151,875

ECONOMIC CONDUCTOR CALCULATIONS

Shelby Energy 12 kV 3-Phase



Justification for Defoe Substation

Introduction

The location for this proposed substation is near the town of Defoe. This town lies on the Shelby-Henry County border in the east-central portion of the Shelby Energy Cooperative (SEC) service territory. *(Refer to the map in this justification).*

For the past few years, residential development has steadily increased in the northern portion of the Clayvillage Substation service area. The feeders into this area are long and are becoming overloaded. Several hundred customers were removed from these feeders around ten years ago in order to reduce loading and to improve system voltage all along the feeders.

These customers were switched onto a feeder from a neighboring cooperative. Blue Grass Energy Cooperative's Bridgeport Substation –located north of Frankfort- continues to serve this area. This source is miles from the SEC service area. While this feed has relieved the voltage problems and reduced the Clayvillage feeder loading, reliability into the area has decreased.

The Clayvillage feeders are once again becoming overloaded. The reliability in the alternate feed area is unsatisfactory. These problems have pressed the need for some type of upgrade on the SEC system.

New Castle Feeder Upgrade – Preferred Scenario

The preferred scenario will consist of a major feeder upgrade southeastward from the New Castle Substation. The existing feeder will be upgraded to a double circuit. The new feeder will express into the Defoe area and will feed eastward into the area presently served by the Blue Grass Energy alternate feed.

This improvement will relieve loading and voltage drop on the Clayvillage feeders and will greatly improve reliability into the area served by Blue Grass Energy. The construction of the Defoe Substation will be deferred until 2019. The Blue Grass Energy alternate feed will be used for emergency purposes.

Year 2006 Items

Distribution - $1,238,767
Transmission - $0
Substation - $0

Year 2013 Items

Distribution - $244,333
Transmission - $0
Substation - $0

Year 2018 Items

Distribution - $585,900
Transmission - $0
Substation - $0

New Castle Feeder Upgrade – Preferred Scenario (cont.)

Year 2019 Items
Distribution - $0
Transmission - $897,980
Substation - $517,000

Year 2023 Items
Distribution - $165,800
Transmission - $36,000
Substation - $378,000

The total distribution present worth cost is $2,451,490.
The total substation present worth cost is $223,398.
The total transmission present worth cost is $390,639.
The total cost of losses present worth cost is $982,398.
The total P.W. Cost of scenario is $4,047,925.

Construct Defoe Substation – Alternate Scenario
The scenario calls for the construction of a 69-12.5 kV distribution substation in the Defoe area. While this is clearly a better scenario operations-wise, it is also 7.3% more costly in present worth dollars. This station is deferred until 2019 in the preferred scenario.

Year 2008 Items
Distribution - $386,800
Transmission - $897,980
Substation - $517,000

Year 2013 Items
Distribution - $362,600
Transmission - $0
Substation - $0

Year 2018 Items
Distribution - $311,200
Transmission - $0
Substation - $0

Year 2023 Items
Distribution - $244,100
Transmission - $0
Substation - $0

Construct Defoe Substation – Alternate Scenario (cont.)

The total distribution present worth cost is $1,694,956.
The total substation present worth cost is $587,293.
The total transmission present worth cost is $1,171,679.
The total cost of losses present worth cost is $888,661.
The total P.W. Cost of scenario is $4,342,589.

Upgrade Clayvillage Feeder – Alternate Scenario

The scenario calls for a capacity upgrade at the Clayvillage Substation. In addition, a massive conductor upgrade of the two northward feeders is required. This upgrade will improve voltage and reliability in the Defoe area. This scenario will also allow SEC to better serve the area that is presently fed by Blue Grass Energy. Distribution costs are extreme in this scenario. This scenario is 30% more costly than the preferred New Castle Substation feeder upgrade. Defoe Substation is deferred until 2018 in this scenario.

Year 2008 Items
Distribution - $1,375,467
Transmission - $0
Substation - $0

Year 2013 Items
Distribution - $335,100
Transmission - $36,000
Substation - $378,000

Year 2018 Items
Distribution - $671,000
Transmission - $897,980
Substation - $517,000

Year 2023 Items
Distribution - $367,400
Transmission - $0
Substation - $0

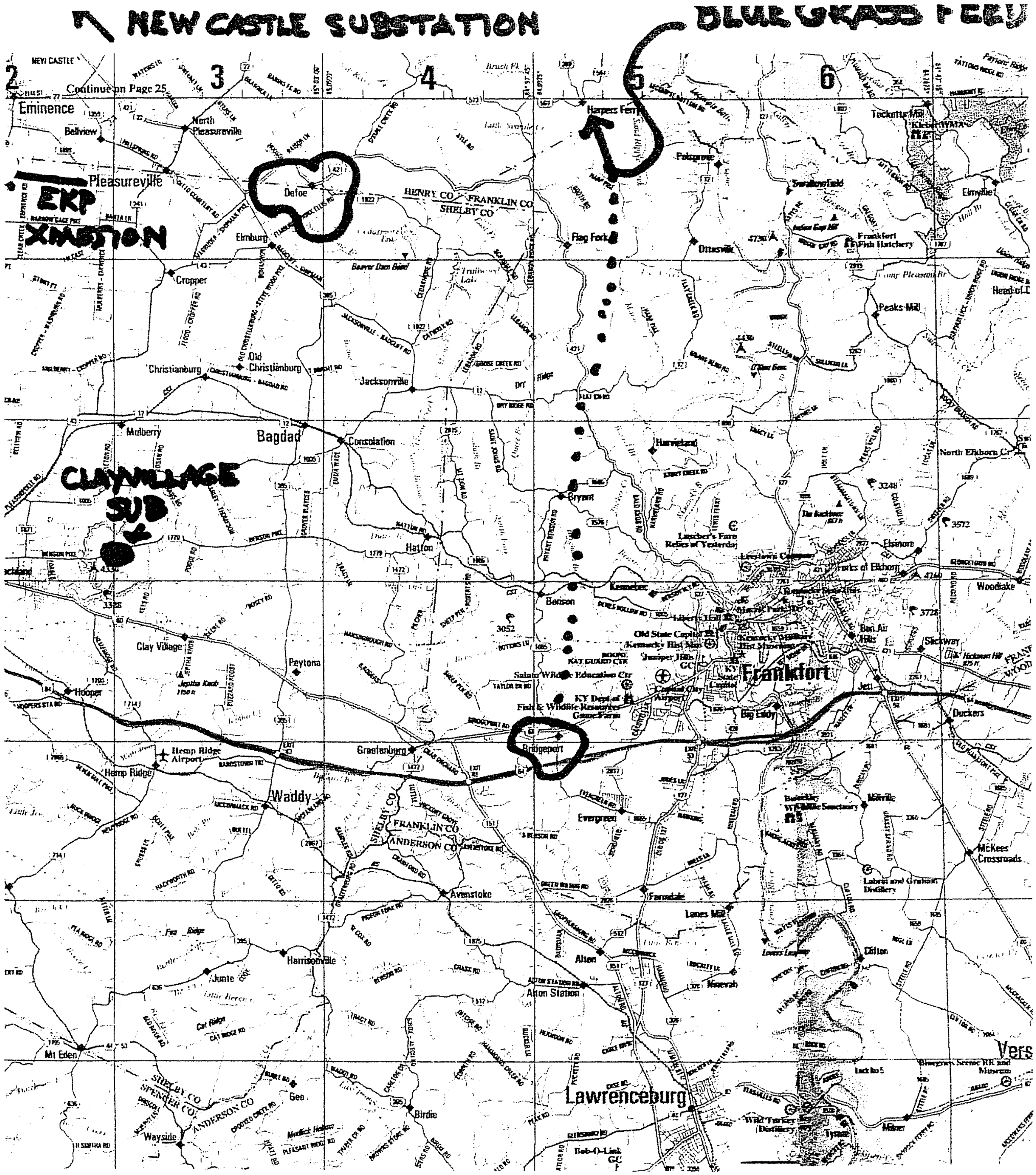
The total distribution present worth cost is $3,070,822.
The total substation present worth cost is $533,403.
The total transmission present worth cost is $495,024
The total cost of losses present worth cost is $1,161,325.
The total P.W. Cost of scenario is $5,260,574.

Conclusion

The upgrade of the New Castle Substation feeders – in present worth dollars – is **$294,664** less than construction of the Defoe Substation in 2008.

A 10% annual carrying charge for substation construction and upgrade was applied in each of the scenarios. The addition of this charge improved the cause for the New Castle Upgrade over the new Defoe Substation. The status of this charge will be considered prior to the start of the recommended scenario.

It is recommended that the New Castle feeder upgrade take place during the 2005-2009 work plan period.


NEW CASTLE SUBSTATION
BLUEGRASS FEED
EKP
XMISSION
CLAYVILLAGE
SUB
Continue on Page 25
2
3
4
5
6
Eminence
Bellview
North Pleasureville
Pleasureville
Defoe
Elmburg
Cropper
Harpers Ferry
Polsgrove
Flag Fork
Ottsville
Swallowfield
Elmville
Frankfort Fish Hatchery
Peaks Mill
Old Christianburg
Christianburg
Jacksonville
Mulberry
Bagdad
Consolation
Harvieland
North Elkhorn Cr
Bryant
Hatton
Elsinore
Forks of Elkhorn
Woodlake
Kennebec
Benson
Clay Village
Peytona
Hooper
Frankfort
Old State Capitol
Bon Air
Jett
Duckers
Hemp Ridge
Hemp Ridge Airport
Graefenburg
Bridgeport
Waddy
Evergreen
Melville
SHELBY CO
FRANKLIN CO
ANDERSON CO
HENRY CO
Avenstoke
Farmdale
McKees Crossroads
Lanes Mill
Harrisonville
Alton
Clifton
Alton Station
Mt Eden
Lawrenceburg
Geo
Birdie
Wayside
Wild Turkey Distillery
Tyrone
Milner

Not To Scale

SHELBY ENERGY COOPERATIVE INC
PRESENT WORTH OF ANNUAL COST
OF DISTRIBUTION SYSTEM IMPROVEMENTS
DEFOE SUBSTATION STUDY
NEW CASTLE UPGRADE

Fixed Charge Rate = 13.80%
Present Worth Discount Factor =5.50%
Inflation Rate = 3.50%

Year	Annual New Plant	Inflation Factor	Inflated New Plant	Inflated Plant Accumulated	Annual Cost	Present Worth Fac.	P. Worth Cost
2005	$0	1.000	$0	$0	$0	1.00	$0
2006	$0	1.035	$0	$0	$0	0.95	$0
2007	$0	1.071	$0	$0	$0	0.90	$0
2008	$1,238,767	1.109	$1,373,443	$1,373,443	$189,535	0.85	$161,411
2009	$0	1.148	$0	$1,373,443	$189,535	0.81	$152,996
2010	$0	1.188	$0	$1,373,443	$189,535	0.77	$145,020
2011	$0	1.229	$0	$1,373,443	$189,535	0.73	$137,460
2012	$0	1.272	$0	$1,373,443	$189,535	0.69	$130,293
2013	$244,333	1.317	$321,740	$1,695,183	$233,935	0.65	$152,432
2014	$0	1.363	$0	$1,695,183	$233,935	0.62	$144,485
2015	$0	1.411	$0	$1,695,183	$233,935	0.59	$136,953
2016	$0	1.460	$0	$1,695,183	$233,935	0.55	$129,813
2017	$0	1.511	$0	$1,695,183	$233,935	0.53	$123,046
2018	$585,900	1.564	$916,322	$2,611,505	$360,388	0.50	$179,675
2019	$51,700	1.619	$83,687	$2,695,191	$371,936	0.47	$175,766
2020	$51,700	1.675	$86,616	$2,781,807	$383,889	0.45	$171,957
2021	$51,700	1.734	$89,647	$2,871,454	$396,261	0.42	$168,245
2022	$51,700	1.795	$92,785	$2,964,239	$409,065	0.40	$164,627
2023	$217,500	1.857	$404,004	$3,368,243	$464,817	0.38	$177,312
	$2,493,300		**$3,368,243**		**$4,503,709**		**$2,451,490**

SHELBY ENERGY COOPERATIVE INC
PRESENT WORTH OF ANNUAL COST
OF TRANSMISSION SYSTEM IMPROVEMENTS
DEFOE SUBSTATION STUDY
NEW CASTLE UPGRADE

Fixed Charge Rate = 12.52%
Present Worth Discount Factor =5.50%
Inflation Rate = 3.50%

Year	Annual New Plant	Inflation Factor	Inflated New Plant	Inflated Plant Accumulated	Annual Cost	Present Worth Fac.	P. Worth Cost
2005	$0	1.000	$0	$0	$0	1.00	$0
2006	$0	1.035	$0	$0	$0	0.95	$0
2007	$0	1.071	$0	$0	$0	0.90	$0
2008	$0	1.109	$0	$0	$0	0.85	$0
2009	$0	1.148	$0	$0	$0	0.81	$0
2010	$0	1.188	$0	$0	$0	0.77	$0
2011	$0	1.229	$0	$0	$0	0.73	$0
2012	$0	1.272	$0	$0	$0	0.69	$0
2013	$0	1.317	$0	$0	$0	0.65	$0
2014	$0	1.363	$0	$0	$0	0.62	$0
2015	$0	1.411	$0	$0	$0	0.59	$0
2016	$0	1.460	$0	$0	$0	0.55	$0
2017	$0	1.511	$0	$0	$0	0.53	$0
2018	$0	1.564	$0	$0	$0	0.50	$0
2019	$897,980	1.619	$1,453,555	$1,453,555	$181,985	0.47	$86,001
2020	$0	1.675	$0	$1,453,555	$181,985	0.45	$81,517
2021	$0	1.734	$0	$1,453,555	$181,985	0.42	$77,267
2022	$0	1.795	$0	$1,453,555	$181,985	0.40	$73,239
2023	$36,000	1.857	$66,870	$1,520,425	$190,357	0.38	$72,615
	$933,980		**$1,520,425**		**$918,298**		**$390,639**

SHELBY ENERGY COOPERATIVE INC
PRESENT WORTH OF ANNUAL COST
OF SUBSTATION IMPROVEMENTS
DEFOE SUBSTATION STUDY
NEW CASTLE UPGRADE

Fixed Charge Rate = 10.90%
Present Worth Discount Factor =5.50%
Inflation Rate = 3.50%

Year	Annual New Plant	Inflation Factor	Inflated New Plant	Inflated Plant Accumulated	Annual Cost	Present Worth Fac.	P. Worth Cost
2005	$0	1.000	$0	$0	$0	1.00	$0
2006	$0	1.035	$0	$0	$0	0.95	$0
2007	$0	1.071	$0	$0	$0	0.90	$0
2008	$0	1.109	$0	$0	$0	0.85	$0
2009	$0	1.148	$0	$0	$0	0.81	$0
2010	$0	1.188	$0	$0	$0	0.77	$0
2011	$0	1.229	$0	$0	$0	0.73	$0
2012	$0	1.272	$0	$0	$0	0.69	$0
2013	$0	1.317	$0	$0	$0	0.65	$0
2014	$0	1.363	$0	$0	$0	0.62	$0
2015	$0	1.411	$0	$0	$0	0.59	$0
2016	$0	1.460	$0	$0	$0	0.55	$0
2017	$0	1.511	$0	$0	$0	0.53	$0
2018	$0	1.564	$0	$0	$0	0.50	$0
2019	$517,000	1.619	$836,865	$836,865	$91,218	0.47	$43,107
2020	$0	1.675	$0	$836,865	$91,218	0.45	$40,860
2021	$0	1.734	$0	$836,865	$91,218	0.42	$38,730
2022	$0	1.795	$0	$836,865	$91,218	0.40	$36,710
2023	$378,000	1.857	$702,131	$1,538,996	$167,751	0.38	$63,991
	$895,000		**$1,538,996**		**$532,624**		**$223,398**

SHELBY ENERGY COOPERATIVE INC
PRESENT WORTH OF ANNUAL COSTS
OF LINE LOSSES
FOR NEW CASTLE UPGRADE

Annual Demand Adj. = 63.2%
Present Worth Discount Factor = 5.50%
Annual Peak Load Factor = 68.8%
Initial Cost per peak kW = $102.81

2.0% Annual Wholesale Power Cost Increase

Year	Peak kW Losses	Annual kW Loss $	Present Worth Factor	P. Worth Cost of
2005	534	$54,901	1.00	$54,901
2006	506	$53,062	0.95	$50,296
2007	478	$51,129	0.90	$45,937
2008	450	$49,096	0.85	$41,811
2009	494	$54,975	0.81	$44,377
2010	538	$61,069	0.77	$46,726
2011	582	$67,384	0.73	$48,870
2012	626	$73,928	0.69	$50,821
2013	669	$80,587	0.65	$52,510
2014	716	$87,973	0.62	$54,335
2015	763	$95,623	0.59	$55,981
2016	810	$103,543	0.55	$57,457
2017	857	$111,742	0.53	$58,774
2018	903	$120,095	0.50	$59,875
2019	891	$120,869	0.47	$57,119
2020	878	$121,488	0.45	$54,418
2021	865	$122,083	0.42	$51,834
2022	852	$122,653	0.40	$49,361
2023	839	$123,197	0.38	$46,995
		---		---
	Total	**$1,675,397**		**$982,398**

SHELBY ENERGY COOPERATIVE INC
PRESENT WORTH OF ANNUAL COST
OF DISTRIBUTION SYSTEM IMPROVEMENTS
DEFOE SUBSTATION STUDY
CONSTRUCTION OF DEFOE SUBSTATION

Fixed Charge Rate = 13.80%
Present Worth Discount Factor =5.50%
Inflation Rate = 3.50%

Year	Annual New Plant	Inflation Factor	Inflated New Plant	Inflated Plant Accumulated	Annual Cost	Present Worth Fac.	P. Worth Cost
2005	$0	1.000	$0	$0	$0	1.00	$0
2006	$0	1.035	$0	$0	$0	0.95	$0
2007	$0	1.071	$0	$0	$0	0.90	$0
2008	$386,800	1.109	$428,852	$428,852	$59,182	0.85	$50,400
2009	$50,700	1.148	$58,179	$487,031	$67,210	0.81	$54,253
2010	$51,700	1.188	$61,403	$548,435	$75,684	0.77	$57,908
2011	$51,700	1.229	$63,553	$611,987	$84,454	0.73	$61,250
2012	$51,700	1.272	$65,777	$677,764	$93,531	0.69	$64,297
2013	$414,300	1.317	$545,554	$1,223,318	$168,818	0.65	$110,002
2014	$51,700	1.363	$70,462	$1,293,780	$178,542	0.62	$110,273
2015	$51,700	1.411	$72,928	$1,366,708	$188,606	0.59	$110,416
2016	$51,700	1.460	$75,480	$1,442,188	$199,022	0.55	$110,439
2017	$51,700	1.511	$78,122	$1,520,311	$209,803	0.53	$110,352
2018	$362,900	1.564	$567,560	$2,087,870	$288,126	0.50	$143,648
2019	$51,700	1.619	$83,687	$2,171,557	$299,675	0.47	$141,617
2020	$51,700	1.675	$86,616	$2,258,172	$311,628	0.45	$139,588
2021	$51,700	1.734	$89,647	$2,347,819	$323,999	0.42	$137,564
2022	$51,700	1.795	$92,785	$2,440,604	$336,803	0.40	$135,545
2023	$295,800	1.857	$549,445	$2,990,049	$412,627	0.38	$157,403
	$2,079,200		**$2,990,049**		**$3,297,710**		**$1,694,956**

SHELBY ENERGY COOPERATIVE INC
PRESENT WORTH OF ANNUAL COST
OF TRANSMISSION SYSTEM IMPROVEMENTS
DEFOE SUBSTATION STUDY
CONSTRUCTION OF DEFOE SUBSTATION

Fixed Charge Rate = 12.52%
Present Worth Discount Factor =5.50%
Inflation Rate = 3.50%

Year	Annual New Plant	Inflation Factor	Inflated New Plant	Inflated Plant Accumulated	Annual Cost	Present Worth Fac.	P. Worth Cost
2005	$0	1.000	$0	$0	$0	1.00	$0
2006	$0	1.035	$0	$0	$0	0.95	$0
2007	$0	1.071	$0	$0	$0	0.90	$0
2008	$897,980	1.109	$995,606	$995,606	$124,650	0.85	$106,154
2009	$0	1.148	$0	$995,606	$124,650	0.81	$100,620
2010	$0	1.188	$0	$995,606	$124,650	0.77	$95,374
2011	$0	1.229	$0	$995,606	$124,650	0.73	$90,402
2012	$0	1.272	$0	$995,606	$124,650	0.69	$85,689
2013	$0	1.317	$0	$995,606	$124,650	0.65	$81,222
2014	$0	1.363	$0	$995,606	$124,650	0.62	$76,987
2015	$0	1.411	$0	$995,606	$124,650	0.59	$72,974
2016	$0	1.460	$0	$995,606	$124,650	0.55	$69,170
2017	$0	1.511	$0	$995,606	$124,650	0.53	$65,564
2018	$0	1.564	$0	$995,606	$124,650	0.50	$62,146
2019	$0	1.619	$0	$995,606	$124,650	0.47	$58,906
2020	$0	1.675	$0	$995,606	$124,650	0.45	$55,835
2021	$0	1.734	$0	$995,606	$124,650	0.42	$52,924
2022	$0	1.795	$0	$995,606	$124,650	0.40	$50,165
2023	$0	1.857	$0	$995,606	$124,650	0.38	$47,550
	$897,980		**$995,606**		**$1,994,399**		**$1,171,679**

SHELBY ENERGY COOPERATIVE INC
PRESENT WORTH OF ANNUAL COST
OF SUBSTATION IMPROVEMENTS
DEFOE SUBSTATION STUDY
CONSTRUCTION OF DEFOE SUBSTATION

Fixed Charge Rate = 10.90%
Present Worth Discount Factor =5.50%
Inflation Rate = 3.50%

Year	Annual New Plant	Inflation Factor	Inflated New Plant	Inflated Plant Accumulated	Annual Cost	Present Worth Fac.	P. Worth Cost
2005	$0	1.000	$0	$0	$0	1.00	$0
2006	$0	1.035	$0	$0	$0	0.95	$0
2007	$0	1.071	$0	$0	$0	0.90	$0
2008	$517,000	1.109	$573,207	$573,207	$62,480	0.85	$53,208
2009	$0	1.148	$0	$573,207	$62,480	0.81	$50,435
2010	$0	1.188	$0	$573,207	$62,480	0.77	$47,805
2011	$0	1.229	$0	$573,207	$62,480	0.73	$45,313
2012	$0	1.272	$0	$573,207	$62,480	0.69	$42,951
2013	$0	1.317	$0	$573,207	$62,480	0.65	$40,712
2014	$0	1.363	$0	$573,207	$62,480	0.62	$38,589
2015	$0	1.411	$0	$573,207	$62,480	0.59	$36,577
2016	$0	1.460	$0	$573,207	$62,480	0.55	$34,671
2017	$0	1.511	$0	$573,207	$62,480	0.53	$32,863
2018	$0	1.564	$0	$573,207	$62,480	0.50	$31,150
2019	$0	1.619	$0	$573,207	$62,480	0.47	$29,526
2020	$0	1.675	$0	$573,207	$62,480	0.45	$27,987
2021	$0	1.734	$0	$573,207	$62,480	0.42	$26,528
2022	$0	1.795	$0	$573,207	$62,480	0.40	$25,145
2023	$0	1.857	$0	$573,207	$62,480	0.38	$23,834
	$517,000		**$573,207**		**$999,673**		**$587,293**

SHELBY ENERGY COOPERATIVE INC
PRESENT WORTH OF ANNUAL COSTS
OF LINE LOSSES
FOR DEFOE SUBSTATION CONSTRUCTION

Annual Demand Adj. = 63.2%
Present Worth Discount Factor = 5.50%
Annual Peak Load Factor = 68.8%
Initial Cost per peak kW = $102.81

2.0% Annual Wholesale Power Cost Increase

Year	Peak kW Losses	Annual kW Loss $	Present Worth Factor	P. Worth Cost of
2005	534	$54,901	1.00	$54,901
2006	479	$50,231	0.95	$47,612
2007	424	$45,353	0.90	$40,747
2008	369	$40,259	0.85	$34,285
2009	400	$44,514	0.81	$35,932
2010	431	$48,923	0.77	$37,433
2011	462	$53,491	0.73	$38,794
2012	493	$58,222	0.69	$40,024
2013	525	$63,241	0.65	$41,208
2014	565	$69,420	0.62	$42,876
2015	605	$75,822	0.59	$44,388
2016	645	$82,451	0.55	$45,753
2017	685	$89,316	0.53	$46,978
2018	725	$96,422	0.50	$48,072
2019	807	$109,474	0.47	$51,734
2020	889	$123,010	0.45	$55,100
2021	971	$137,043	0.42	$58,186
2022	1053	$151,589	0.40	$61,006
2023	1136	$166,808	0.38	$63,632
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	Total	**$1,560,487**		**$888,661**

SHELBY ENERGY COOPERATIVE INC
PRESENT WORTH OF ANNUAL COST
OF DISTRIBUTION SYSTEM IMPROVEMENTS
DEFOE SUBSTATION STUDY
CLAYVILLAGE UPGRADE

Fixed Charge Rate = 13.80%
Present Worth Discount Factor =5.50%
Inflation Rate = 3.50%

Year	Annual New Plant	Inflation Factor	Inflated New Plant	Inflated Plant Accumulated	Annual Cost	Present Worth Fac.	P. Worth Cost
2005	$0	1.000	$0	$0	$0	1.00	$0
2006	$0	1.035	$0	$0	$0	0.95	$0
2007	$0	1.071	$0	$0	$0	0.90	$0
2008	$1,375,467	1.109	$1,525,005	$1,525,005	$210,451	0.85	$179,223
2009	$0	1.148	$0	$1,525,005	$210,451	0.81	$169,879
2010	$0	1.188	$0	$1,525,005	$210,451	0.77	$161,023
2011	$0	1.229	$0	$1,525,005	$210,451	0.73	$152,628
2012	$0	1.272	$0	$1,525,005	$210,451	0.69	$144,672
2013	$372,900	1.317	$491,038	$2,016,043	$278,214	0.65	$181,284
2014	$37,800	1.363	$51,518	$2,067,560	$285,323	0.62	$176,224
2015	$37,800	1.411	$53,321	$2,120,881	$292,682	0.59	$171,345
2016	$37,800	1.460	$55,187	$2,176,068	$300,297	0.55	$166,638
2017	$37,800	1.511	$57,118	$2,233,186	$308,180	0.53	$162,097
2018	$760,500	1.564	$1,189,389	$3,422,575	$472,315	0.50	$235,478
2019	$89,500	1.619	$144,873	$3,567,448	$492,308	0.47	$232,650
2020	$89,500	1.675	$149,944	$3,717,392	$513,000	0.45	$229,790
2021	$89,500	1.734	$155,192	$3,872,584	$534,417	0.42	$226,903
2022	$89,500	1.795	$160,623	$4,033,207	$556,583	0.40	$223,995
2023	$456,900	1.857	$848,687	$4,881,894	$673,701	0.38	$256,994
	$3,474,967		**$4,881,894**		**$5,759,273**		**$3,070,822**

SHELBY ENERGY COOPERATIVE INC
PRESENT WORTH OF ANNUAL COST
OF TRANSMISSION SYSTEM IMPROVEMENTS
DEFOE SUBSTATION STUDY
CLAYVILLAGE UPGRADE

Fixed Charge Rate = 12.52%
Present Worth Discount Factor =5.50%
Inflation Rate = 3.50%

Year	Annual New Plant	Inflation Factor	Inflated New Plant	Inflated Plant Accumulated	Annual Cost	Present Worth Fac.	P. Worth Cost
2005	$0	1.000	$0	$0	$0	1.00	$0
2006	$0	1.035	$0	$0	$0	0.95	$0
2007	$0	1.071	$0	$0	$0	0.90	$0
2008	$0	1.109	$0	$0	$0	0.85	$0
2009	$0	1.148	$0	$0	$0	0.81	$0
2010	$0	1.188	$0	$0	$0	0.77	$0
2011	$0	1.229	$0	$0	$0	0.73	$0
2012	$0	1.272	$0	$0	$0	0.69	$0
2013	$36,000	1.317	$47,405	$47,405	$5,935	0.65	$3,867
2014	$0	1.363	$0	$47,405	$5,935	0.62	$3,666
2015	$0	1.411	$0	$47,405	$5,935	0.59	$3,475
2016	$0	1.460	$0	$47,405	$5,935	0.55	$3,293
2017	$0	1.511	$0	$47,405	$5,935	0.53	$3,122
2018	$897,980	1.564	$1,404,401	$1,451,806	$181,766	0.50	$90,621
2019	$0	1.619	$0	$1,451,806	$181,766	0.47	$85,897
2020	$0	1.675	$0	$1,451,806	$181,766	0.45	$81,419
2021	$0	1.734	$0	$1,451,806	$181,766	0.42	$77,174
2022	$0	1.795	$0	$1,451,806	$181,766	0.40	$73,151
2023	$0	1.857	$0	$1,451,806	$181,766	0.38	$69,338
	$933,980		**$1,451,806**		**$1,120,273**		**$495,024**

SHELBY ENERGY COOPERATIVE INC
PRESENT WORTH OF ANNUAL COST
OF SUBSTATION IMPROVEMENTS
DEFOE SUBSTATION STUDY
CLAYVILLAGE UPGRADE

Fixed Charge Rate = 10.90%
Present Worth Discount Factor =5.50%
Inflation Rate = 3.50%

Year	Annual New Plant	Inflation Factor	Inflated New Plant	Inflated Plant Accumulated	Annual Cost	Present Worth Fac.	P. Worth Cost
2005	$0	1.000	$0	$0	$0	1.00	$0
2006	$0	1.035	$0	$0	$0	0.95	$0
2007	$0	1.071	$0	$0	$0	0.90	$0
2008	$0	1.109	$0	$0	$0	0.85	$0
2009	$0	1.148	$0	$0	$0	0.81	$0
2010	$0	1.188	$0	$0	$0	0.77	$0
2011	$0	1.229	$0	$0	$0	0.73	$0
2012	$0	1.272	$0	$0	$0	0.69	$0
2013	$378,000	1.317	$497,754	$497,754	$54,255	0.65	$35,353
2014	$0	1.363	$0	$497,754	$54,255	0.62	$33,510
2015	$0	1.411	$0	$497,754	$54,255	0.59	$31,763
2016	$0	1.460	$0	$497,754	$54,255	0.55	$30,107
2017	$0	1.511	$0	$497,754	$54,255	0.53	$28,537
2018	$517,000	1.564	$808,565	$1,306,319	$142,389	0.50	$70,989
2019	$0	1.619	$0	$1,306,319	$142,389	0.47	$67,289
2020	$0	1.675	$0	$1,306,319	$142,389	0.45	$63,781
2021	$0	1.734	$0	$1,306,319	$142,389	0.42	$60,456
2022	$0	1.795	$0	$1,306,319	$142,389	0.40	$57,304
2023	$0	1.857	$0	$1,306,319	$142,389	0.38	$54,316
	$895,000		**$1,306,319**		**$1,125,609**		**$533,403**

SHELBY ENERGY COOPERATIVE INC
PRESENT WORTH OF ANNUAL COSTS
OF LINE LOSSES
FOR CLAYVILLAGE UPGRADE

Annual Demand Adj. = 63.2%
Present Worth Discount Factor = 5.50%
Annual Peak Load Factor = 68.8%
Initial Cost per peak kW = $102.81

2.0% Annual Wholesale Power Cost Increase

Year	Peak kW Losses	Annual kW Loss $	Present Worth Factor	P. Worth Cost of
2005	534	$54,901	1.00	$54,901
2006	544	$57,047	0.95	$54,073
2007	554	$59,258	0.90	$53,240
2008	563	$61,425	0.85	$52,310
2009	609	$67,772	0.81	$54,707
2010	655	$74,349	0.77	$56,887
2011	701	$81,162	0.73	$58,863
2012	747	$88,218	0.69	$60,644
2013	795	$95,764	0.65	$62,400
2014	826	$101,489	0.62	$62,682
2015	857	$107,403	0.59	$62,877
2016	888	$113,514	0.55	$62,990
2017	919	$119,827	0.53	$63,027
2018	950	$126,346	0.50	$62,991
2019	1011	$137,148	0.47	$64,812
2020	1072	$148,331	0.45	$66,442
2021	1133	$159,907	0.42	$67,894
2022	1194	$171,887	0.40	$69,175
2023	1257	$184,575	0.38	$70,409
		---		---
	Total	**$2,010,324**		**$1,161,325**

Shelby Energy Coop Inc
Annual Loss Cost Calculations

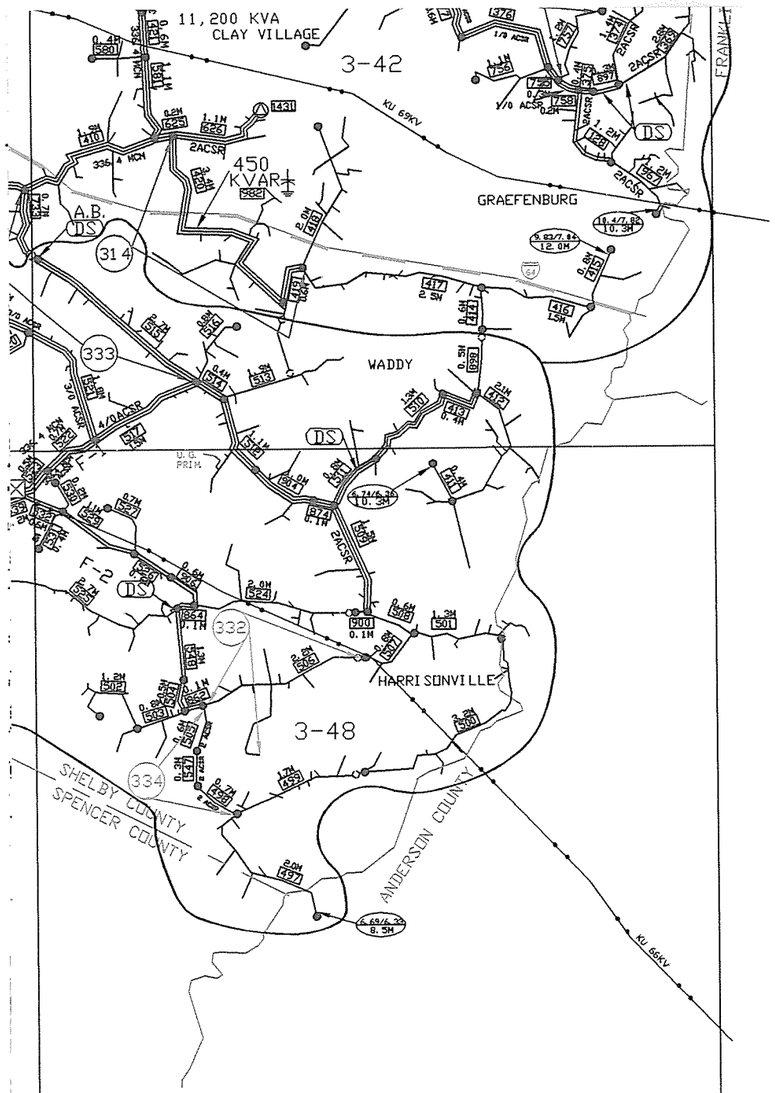
Month	kWh	kW	kW Loss	Load Fact	Loss Fact	kWh Loss
JANUARY	43,975,217	93,662	1.00	0.63	0.44	324
FEBRUARY	39,932,175	79,765	0.73	0.74	0.59	285
MARCH	36,250,537	70,574	0.57	0.69	0.51	216
APRIL	31,889,588	67,232	0.52	0.66	0.47	174
MAY	34,982,154	66,611	0.51	0.71	0.53	200
JUNE	37,084,941	70,380	0.56	0.73	0.57	231
JULY	37,693,836	77,830	0.69	0.65	0.46	236
AUGUST	37,707,247	77,519	0.68	0.65	0.46	236
SEPTEMBER	34,401,082	72,200	0.59	0.66	0.47	203
OCTOBER	31,950,704	55,901	0.36	0.77	0.62	164
NOVEMBER	34,302,337	66,525	0.50	0.72	0.55	198
DECEMBER	43,448,003	87,853	0.88	0.66	0.48	313
TOTAL	443,617,821	886,052	7.59	8.28	6.14	2780

KW CHARGE = $5.39/KW **$5.39 x 7.59(KW LOSS)= $40.90**

ENERGY = $0.0222675/KWH **$0.0222675 x 2780(KWH LOSS $61.90**

TOTAL LOSS COST/KW PEAK $102.81

"N" = 7.59/12 = 0.63



- 1 PHASE O. H.
- 3 PHASE U. G.
- V PHASE U. G.
- 1 PHASE U. G.

7.2/12.47 KV

- 3 PHASE O. H.
- V PHASE O. H.
- 1 PHASE O. H.
- 3 PHASE U. G.
- V PHASE U. G.
- 1 PHASE U. G.

14.4/24.94 KV

- TRANSMISSION LINE
- 555 / 1.5M — LINE SECTION WITH NUMBER & MILEAGE
- 2ACSR — WIRE SIZE (IF NOT LABELED #4ACSR OR EQUIVALENT)
- PROPOSED OPEN POINT
- PROPOSED LINE CLOSED
- EXISTING OPEN POINT
- 401 — LARGE POWER LOAD WITH NUMBER
- DS — DISCONNECT SWITCH
- A, B. — AIR BREAK SWITCH
- V M — VOLTMETER
- AUTO-BOOSTER OR VOLTAGE REGULATOR
- PROPOSED AUTO-BOOSTER OR VOLTAGE REGULATOR
- 11.81/6.23 / 8.3M — UNCORRECTED VOLTAGE DROP/CORRECTED VOLTAGE DROP / DISTANCE FROM SUBSTATION
- PROPOSED BOUNDARY
- SUBSTATION BOUNDARY
- 301 — SYSTEM IMPROVEMENT
- ELECTRICAL CAPACITOR

SCALE
1 INCH= 1 MILE
0 1/2 1 2 3

ELBY ENERGY
)PERATIVE, INC.

SHELBYVILLE, KENTUCKY

ENTUCKY 30 SHELBY

). G.	APPD. BY: W. A.		DATE: 1-27-97

DATE	REVISIONS	
6-23-86	UPDATED	D. T. E.
12-19-88	WORKPLAN 1989-1990	D. T. E.
3-17-89	WORKPLAN 1989-1990	D. T. E.
4-8-91	WORKPLAN 1991-1993	D. T. E.
7-12-95	UPDATED	D. T. E.
1-24-97	WORKPLAN 1997-2000	D. T. E.
8-13-98	REVISIONS	D. T. E.
1-4-01	WORKPLAN 2001-2004	D. T. E.
5-12-05	WORKPLAN 2005-2009	D. T. E.

CIRCUIT DIAGRAM

STATE	KEY	DETAIL	TOWN
KY	3 4		