2008 Long Range Plan &

2003-2005 Construction Work Plan

January 1, 2003 - December 31, 2005

Clark Energy Cooperative Inc. (KY 49)

Engineering Department

Winchester, Kentucky

United States Department of Agriculture
Rural Economic and Community Development
Rural Utilities Service
Washington, DC 20250

January 10, 2003

2003-2005 Construction Workplan (CWP) & 2008 Long Range Plan (LRP)

Overt Carroll, President & CEO
Clark Energy Cooperative, Inc.

I have completed my review of the cooperative's 2003-2005 CWP & 2008 LRP, which was prepared by the Clark Engineering Department and R.W. Beck, and find it to be generally satisfactory for loan contract purposes. Approval to proceed with the proposed distribution system construction is contingent upon RUS's review and approval of an Environmental Report (reference 7 CFR 1794).

Headquarters, SCADA, and load management projects will be reviewed/approved by the Northern Regional Division office, as necessary. This action will be taken after their receipt of the CWP and other supporting documents (i.e., appropriate feasibility and engineering studies).

You should make a special effort to inform all of the cooperative's employees and contractors, involved in the construction of utility plant of any commitments made in the Environmental Report covering the construction of the facilities recommended in the CWP.

Changes (line improvements, tie lines, extensions, substations, etc.) in the CWP will require RUS approval. The environmental acceptability of any such changes shall also be established in accordance with 7 CFR 1794. The procedure for satisfying these environmental requirements shall be the same as that used in connection with this CWP approval.

It is your responsibility to determine whether or not loan funds and/or general funds are available for the proposed construction. If general funds are used, the requirements as outlined in 7 CFR 1717 need to be followed.

The construction shall be accomplished in accordance with RUS requirements. Specific reference should be made to 7 CFR 1726, Electric System Construction Policies and Procedures.

Mike Norman
RUS Field Representative

United States Department of Agriculture
Rural Development

Rural Business–Cooperative Service • Rural Housing Service • Rural Utilities Service
Washington, DC 20250

JAN 21 2003

Mr. Overt I. Carroll
President/CEO
Clark Energy Cooperative, Inc.
P.O. Box 748
Winchester, Kentucky 40392-0748

Dear Mr. Carroll:

The Rural Utilities Service's (RUS) Engineering and Environmental Staff reviewed the project description for your 2002-2005 Construction Work Plan and the proposed office renovation project. They have determined that the projects proposed therein meet the criteria for a categorical exclusion in accordance with RUS Environmental Policies and Procedures, 7 CFR 1794.

No further information regarding potential environmental impacts associated with the projects in the work plan will be needed from you provided they are constructed as proposed and no latent environmental impacts are discovered during construction.

Thank you for your assistance and cooperation in helping us fulfill RUS' environmental review requirements.

Sincerely,

CHARLES M. PHILPOTT
Chief, Engineering Branch
Northern Regional Division

Clark Energy Cooperative, Inc.
Winchester, Kentucky
KY49

LONG RANGE PLAN AND CONSTRUCTION WORK PLAN

I hereby certify that the 2008 Long Range Plan and 2003-2005 Construction Work Plan were prepared under my direct supervision, and that I am duly registered professional engineer under the laws of the State of Kentucky.

Joni S. Batson, P.E
Project Manager

STATE OF KENTUCKY
JONI S. BATSON 18492
LICENSED PROFESSIONAL ENGINEER
1/6/03

Date: 1/6/03

Paul Keith Mullen, Jr., P.E.
Project Engineer

07-00684-10000-2000 / 051983 | 3884 | G:\3884\00684\LRP Assistance\Certification.doc

400 Professional Park Drive, Suite 100 Goodlettsville, TN 37072-2100 Phone (615) 859-3900 Fax (615) 851-6066

CLARK ENERGY
COOPERATIVE
A Touchstone Energy® Cooperative

EXCERPT

WHEREAS, a five-year Long Range Plan dated 2008 and a three-year Construction Work Plan dated 2003-2005 in the amount of $17,477,087 has been prepared by Shannon D. Messer, System Engineer and R.W. Beck and Associates.

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors of Clark Energy Cooperative, Inc. hereby approves the 2008 Long Range Plan and 2003-2005 Construction Work Plan as a plan of action to be followed, or until amended with the approval of RUS.

I, Virgil O. Ginter, Chairman of the Board of Clark Energy Cooperative, Inc., hereby certify that the foregoing is a true and correct copy of an excerpt taken from the minutes of a regular meeting of the Board of Directors held on December, 19, 2002.

Virgil O. Ginter

Virgil O. Ginter

I, Steve Hale, Secretary-Treasurer of Clark Energy Cooperative, Inc., hereby certify that the foregoing is a true and correct copy of an excerpt taken from the minutes of a regular meeting of the Board of Directors held on December 19, 2002.

Steve Hale

2640 Iron Works Road • P.O. Box 748 • Winchester, Kentucky 40392 • Tel. (859) 744-4251 • 1-800-992-3269 • Fax (859) 744-4218

2008 Long Range Plan &
2003-2005 Construction Work Plan

Table of Contents

2008 Long Range Plan &
2003-2005 Construction Work Plan

1 Executive Summary

Clark Energy Cooperative Inc., KY 49, (Clark) provides electric service to members within Central and East Central Kentucky. A growing membership requires Clark develop distribution plans that best satisfy members' needs while improving electric service reliability. Improving service reliability and power quality is one goal of Clark's present strategic plan. We anticipate long-term distribution needs by preparing long range plans. Construction work plans are periodically prepared as short-term action plans to implement long range plan goals and recommendations. Consistent with this approach, the 2008 Long Range Plan (LRP) identifies long-term distribution system needs and proposed substations through winter 2007-2008. Similarly, the 2003-2005 Construction Work Plan (CWP) is the first of two CWP action plans to meet anticipated short-term needs consistent with providing long-term economical and reliable electric service.

RUS traditionally requires borrowers develop twenty (20) year LRPs as a supporting foundation study or road map for specific system improvement projects recommended within a CWP. Planning horizons of twenty or more years are impractical for prioritizing today's business challenges except where large costs such as substation and transmission versus distribution investment are being considered for evaluation. A five-year planning horizon offers Clark a better management tool to more frequently assess anticipated present and long-term distribution system needs. RUS requires LRPs and CWPs be based on a current load forecast study. The 2002 Power Requirements Study (PRS) was approved by the Clark Board of Directors in summer 2002 and is one foundation study anticipating future member needs and load growth. Clark management staff participates with East Kentucky Power Cooperative (EKP) staff to revise the PRS every two years. Future CWPs based on a LRP revised every five years and a PRS prepared bi-annually allows load growth trends be more closely monitored and member needs be addressed more frequently using better quality information. So, a revised LRP will be presented for approval by the Clark Board of Directors and RUS every five years.

All distribution improvement projects, programs and activities recommended within the LRP, CWP and substation studies are consistent with planning criteria to ensure orderly expansion of the electric system. Similarly, these planning criteria are used to identify needs so that the distribution system is not over-built or under-built, i.e. projects are built on-time to meet forecast load growth. Specifically, proposed system improvements and substations are investigated from an analysis developed to review the adequacy of the electric system at summer and winter design loads. Data needed for LRP, CWP and substation studies is obtained from billing systems, mapping models, system peak demand history and the 2002 PRS. Design criteria are used to review the adequacy of the electric system and prepare all LRP, CWP and substation recommendations. All projects are evaluated at design load using a variety of voltage, circuit loading, sectionalizing, reliability and economic criteria summarized in Table No. 1 on the next page. An on-going protective coordination and sectionalizing program is also important to improve electric system reliability.

Table No. 1 Distribution Primary System Design Criteria Requirements	
Description	**Criteria and/or Description**
Design Load	152.79 MW, Winter 2007-2008 for LRP and 141.66 MW, Winter 2004-2005 for CWP.
Voltage Levels	Maintain max. 8-Volt drop or 118 min. level based on 126-Volt bus.
Conductor Loading	Economic conductor loading analysis and long-range plans shall be reviewed prior to selecting primary conductors for all major construction. System improvements are reviewed when conductor loading ≥ 80% (radial) or ≥ 50% (intertie) of thermal rating.
Losses and Power Factor	All losses are evaluated at EKP's avoided costs. Capacitor banks are installed considering losses and wholesale power factor billing.
Sectionalization	On-going studies assess the adequacy of protective coordination schemes as loads and fault currents change. See Table No. 13 for expanded criteria.
Service Reliability	Service interruptions not to exceed 3 hours per consumer per year are a goal.
Conductor Replacements	Conductors found to be in poor condition or possessing an excessive number of splices are replaced.

The LRP anticipates electric system improvements and routine plant changes over a five-year planning horizon. Similarly, the CWP is an action plan to begin implementing LRP recommendations and anticipates system improvements to serve a forecast short-term design load. Other short-term needs and equipment is also included within the CWP to improve power factor, regulation and sectionalization. The CWP also includes a renovation and expansion of the headquarters office facilities to serve business and operational needs. A majority of CWP costs involves routine activities such as new service construction, service upgrades, pole and primary conductor replacements, meters, transformers and security lights. Finally, new substations are evaluated over a longer twenty year period to ensure that the best least cost alternatives are selected. Highlights of the 2008 LRP, 2003-2005 CWP and recommendations for three new distribution substations are summarized within Table No. 2 below.

Table No. 2 Summary of 2003-2005 CWP and 2008 LRP				
Description or Category	**2003-2005 CWP - $17,477,087**		**2008 LRP - $33,589,075**	
	Quantity/Miles	**Cost**	**Quantity/Miles**	**Cost**
New Services	2601	$5,873,988	5202	$12,293,088
Service Upgrades	354	$329,220	708	$688,884
New Security Lights	1518	$340,032	3036	$710,424
Pole Replacements	1086	$1,034,958	2172	$2,165,484
New Meters	1900	$233,700	6800	$877,200
New Transformers	3714	$2,971,200	7428	$6,217,236
System Improvements	85.24-miles	$3,964,989	115.63-miles	$6,545,426
Equipment & Sectionalizing		$1,529,000		$2,891,333
Office Renovation & Expansion		$1,200,000		$1,200,000
Note: Hardwicks Ck Substation is recommended in 2004 to serve portions of Powell County. Miller Hunt Substation is recommended in 2004 to serve parts of Clark and Montgomery Counties. Hinkston Substation is recommended in 2004 to replace the existing A.O. Smith delivery point.				

2 Review of Existing System

Assessing the present distribution system provides an opportunity to review many engineering and operating activities. Key areas to review include general system statistics, operations and maintenance surveys, recent transmission and substation activities and the status of the 1999-2003 CWP. A review of Clark's 2002 PRS similarly provides an opportunity to assess long term needs of the distribution system.

2.1 General System Statistics

Clark provides electric service to about 24,135 customers located predominantly in the counties of Clark, Montgomery, Bath, Menifee, Powell, Madison and Bourbon. Portions of the counties of Fayette, Rowan, Morgan, Wolfe and Estill are also served. Service to consumers is provided through about 2,850 circuit miles of distribution plant. General system statistics over the ten year interval 1992-2001 is illustrated within Table No. 3 below.

Table No. 3
General System Operating Statistics

Description	2001	2000	1999	1998	1997	1996	1995	1994	1993	1992
Distribution Plant (Miles)	2,805	2,754	2,716	2,675	2,638	2,597	2,563	2,533	2,501	2,478
Avg. Customers Served	23,427	22,916	22,464	21,901	21,138	20,363	19,743	19,014	18,411	17,810
Residential (kWh/Mo.)	1060	1022	981	949	942	967	922	893	934	858
Energy Purchased (MWh)	401,373	374,001	353,317	337,162	321,396	323,310	296,611	277,933	274,687	252,997
Energy Sold (MWh)	372,721	352,668	329,298	315,974	301,703	299,634	278,532	258,367	257,314	233,618
Percent System Losses	7.14%	5.70%	6.80%	6.28%	6.13%	7.32%	6.10%	7.04%	6.32%	7.66%

2.2 Operations and Maintenance Survey

The frequency of severe storms throughout Clark's service area is an important factor affecting the overall magnitude of indices used to measure service outages or interruptions. Lower outage duration in years not frequented by severe weather is attributed (in no particular order of importance) to Clark's proactive activities encompassing O&M, system improvements, sectionalization and new substations. Service outages in years with severe weather would possibly been of longer duration or more frequent without these proactive activities. A traditional outage metric of the moving five-year average outage duration over the past ten years is provided within Tables Nos. 4 & 5 and accompanying graphs on the next page. RUS traditionally regards an annual average of five hours of outages per member per year to be an acceptable indicator of good reliability. Clark's reliability goal has heretofore been obtaining at least three hours of outage per member without severe storms. Tabular and graphical data on the next page indicates that the present five-year average (1996-2001) of total service outage duration is about 4.61 hours per member. The high value of the present five-year outage index is attributed to a major snowstorm in March 1998. (Two severe ice storms also occurred in Feb-Mar 1994.) Clark's five-year average outage duration without major storms, however, is only 2.07 hours per member.

Table No. 4
Service Interruptions - Annual Customer-Hours Per Customer

Year	Avg No. of Customers	EKP Outages	Scheduled Outages	Unscheduled Outages	Extreme Storms	Total w/ Storms	Total w/o Storms
1992	17810	0.77	0.11	1.72	0.00	2.60	2.60
1993	18403	0.32	0.05	2.10	0.00	2.47	2.47
1994	19014	0.82	0.00	3.59	27.17	31.58	4.41
1995	19745	0.10	0.01	1.30	0.23	1.64	1.41
1996	20363	0.74	0.01	1.41	0.00	2.16	2.16
1997	21138	0.13	0.01	1.49	0.00	1.63	1.63
1998	21901	0.78	0.00	2.05	12.69	15.52	2.83
1999	22464	0.23	0.03	1.40	0.00	1.66	1.66
2000	22916	0.58	0.05	1.81	0.00	2.44	2.44
2001	23427	0.38	0.00	1.40	0.00	1.78	1.78

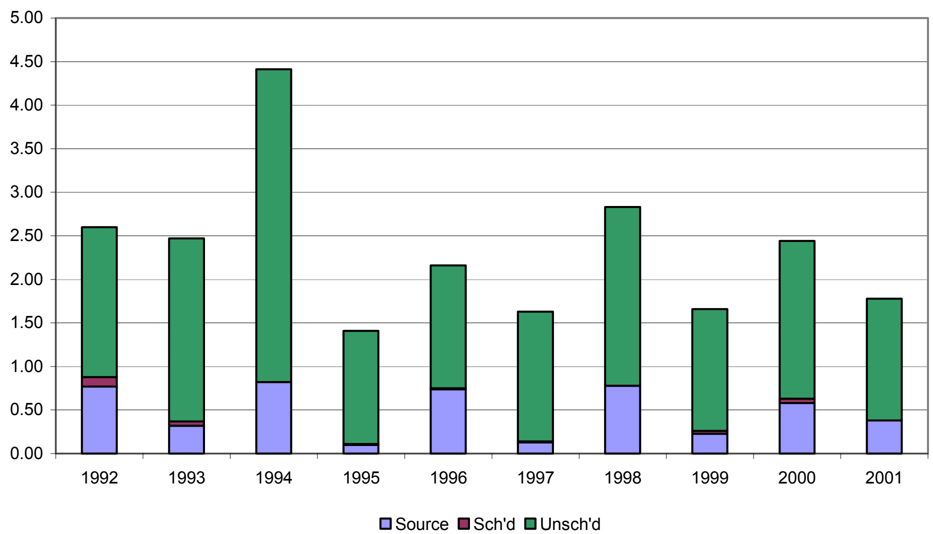
Notes: Extreme storms not reported before 1994. 1994 & 1998 storm total are attributed to two ice storms in Feb-Mar 1994 and a March 1998 snowstorm.

Table No. 5
Service Interruptions - Moving Five-Year Average of Annual Customer-Hours Per Customer

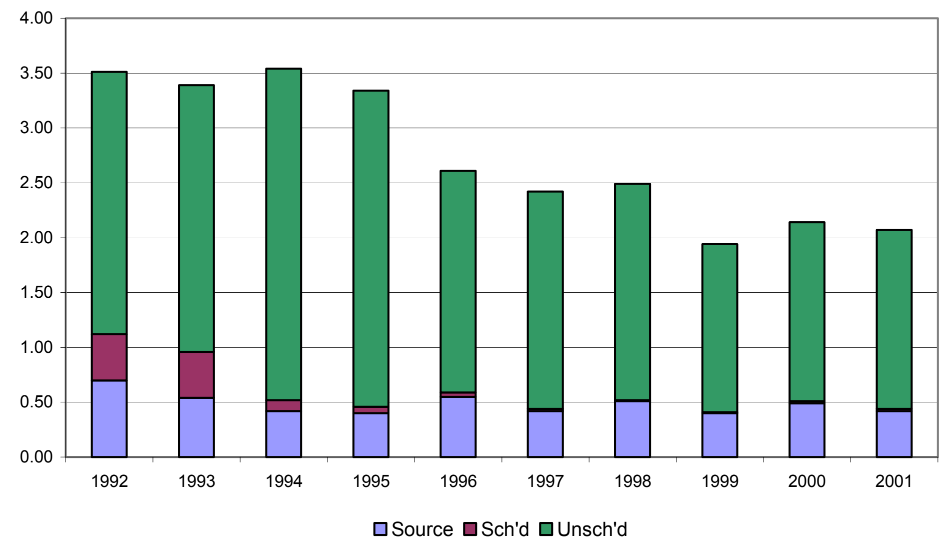
Year	Avg No. of Customers	EKP Outages	Scheduled Outages	Unscheduled Outages	Extreme Storms	Total w/ Storms	Total w/o Storms
1992	16895	0.70	0.42	2.39	0.00	3.51	3.51
1993	17359	0.54	0.42	2.43	0.00	3.39	3.39
1994	17864	0.42	0.10	3.02	5.43	8.97	3.54
1995	18438	0.40	0.06	2.88	5.48	8.82	3.34
1996	19067	0.55	0.04	2.02	5.48	8.09	2.61
1997	19733	0.42	0.02	1.98	5.48	7.90	2.42
1998	20432	0.51	0.01	1.97	8.02	10.51	2.49
1999	21122	0.40	0.01	1.53	2.58	4.52	1.94
2000	21756	0.49	0.02	1.63	2.54	4.68	2.14
2001	22369	0.42	0.02	1.63	2.54	4.61	2.07

Notes: Extreme storms not reported before 1994. 1994 & 1998 storm total are attributed to two ice storms in Feb-Mar 1994 and a March 1998 snowstorm.

Annual Customer-Hours of Outage per Customer
Extreme Storms Excluded



Five-Year Moving Average of Annual Customer-Hours of Outage per Customer
Extreme Storms Excluded



Clark schedules right-of-way trimming and clearing on a four-year system rotation. Five to seven contract right-of-way crews have been regularly employed over the past several years. A herbicide application program complements trimming and clearing efforts to improve vegetation management within distribution rights-of-ways. The objective of Clark's pole inspection and treatment program is to extend the service life of pole plant and identify needed replacements. Pole inspection and treatment is conducted on about ten percent of plant each year with the entire system scheduled on a ten-year rotation. About 2-5 percent of the nearly 5,500 poles inspected annually require replacement and no backlog exists of poles awaiting replacement. Clark is midway through the third rotation of inspection and treatment across the distribution system. Similarly, an objective of Clark's line inspection program is to identify aging circuit conductors for replacement. About 62-miles of aging overhead conductor is recommended for replacement within the 2008 LRP. Almost 11-mile of this total consists of old copper conductor scheduled within the 2003-2005 CWP as part of system improvement projects. Similarly, almost 27-miles of #4 ACSR conductor will be replaced as part of proposed CWP conversion projects.

An ongoing assessment of protective coordination and sectionalizing schemes is required as load growth continues. Sectionalizing studies establish load and fault currents to review the adequacy of thermal and interrupting ratings required of distribution equipment used within protective coordination and sectionalizing schemes. A sectionalizing scheme must protect distribution network equipment and components from excessive over current and/or over voltage conditions. A properly designed scheme attempts to limit or sectionalize an outage on distribution feeders to relatively small areas and maintain service to the greatest number of members. Use of existing Milsoft WindMil engineering software and migrating the existing mapping system to Power Delivery Associates' (PDA) OriginGIS™ software will improve the quality of distribution modeling. Maintaining accurate and current distribution models is a key to maintaining an ongoing sectionalizing program. Distribution modeling and use of engineering analysis software to study sectionalizing schemes is regularly supplemented with reviews of load data obtained from key sectionalizing and regulation points. Improvements to distribution circuits and/or sectionalizing schemes are considered where members have experienced more frequent outages. A new outage management system (Milsoft DisSPatch™) is planned for 2003 installation to assist with Clark's management of outages, better allocate resources and improve post-outage information.

Clark's O&M programs regularly provide an opportunity to inspect distribution facilities. The O&M program consists of more than right-of-way, pole inspection and treatment and sectionalizing activities. An annual aerial survey of half the distribution system searches for acute problems not easily detected between long-term inspections scheduled on a rotating basis across the system over several years. A new automated meter reading system (Hunt Turtle™ AMR) installed at Clark is anticipated will provide clues of possible meter tampering and overloaded distribution transformers. Similarly, a sample meter test plan is in place to provide statistical measures of meter population accuracy by type. Finally, an ongoing testing and maintenance program for distribution equipment such as reclosers, regulators and capacitor banks complements Clark's O&M programs.

2.3 Transmission and Substation Facilities

Clark purchases wholesale power from East Kentucky Power Cooperative (EKP) at twenty delivery points or substations. All substations are owned by EKP and wholesale power is purchased at either 12.5 kV or 25 kV. Another delivery point provides 69 kV service to a single customer that owns their substation for a remotely-operated petroleum pipeline pumping station. All transmission lines serving Clark's delivery points are rated 69 kV or 138 kV and primarily owned by EKP. All of Clark's delivery points have contingency transmission service except for six substations served by relatively short radial tap lines. Each of these radial lines is tapped off area transmission where contingency service exists. Kentucky Utilities (KU) provides contingency transmission service for two separate EKP 69 kV radial taps serving three of Clark's delivery points. Similarly, KU provides distribution service from one of their substations to a third EKP radial transmission line rated 69 kV, but operating at 12.5 kV. This radial tap extends distribution service to another delivery point less than a mile away where voltage is stepped up to 25 kV via a platform-mounted 5 MVA autotransformer for wholesale delivery to Clark.

EKP has recently upgraded portions of their transmission network and constructed new substation delivery points in Clark's service area. The bulk transmission network has improved with construction of new 138 kV lines between EKP power stations, transmission substations and new interconnections with KU. Aside from improving the bulk transmission system, these 138 kV projects improve EKP's 69 kV system by strengthening their ability to maintain contingency service in Clark's service area. EKP has also improved parts of the 69 kV subtransmission network by reconductoring key lines for a higher ampacity thermal rating. All these projects improve contingency service to 69 kV and 138 kV delivery points throughout Clark's service area. Similarly, EKP has constructed eight new substation delivery points to better serve Clark's distribution load since 1992. Several existing substations have also been upgraded to serve anticipated load or autotransformers added to accommodate local 25 kV projects. A summary of existing substation and recent substation and transmission improvements is provided within Table No. 6 below and Table No. 7 on the next page. See Section 6 for proposed substations.

Table No. 6
Summary of Substations and Ratings

Substation	Rating	Base MVA	Substation	Rating	Base MVA
A.O. Smith	12.5/25 kV	3.00	Mt. Sterling	69/25/12.5 kV	11.20
Blevins Valley	69/25/12.5 kV	5.60	Preston	69 kV	NA
Bowen	69/12.5 kV	5.75	Reid Village	69/12.5 kV	5.60
Cave Run	69/12.5 kV	2.00	Sideview	69/25/12.5 kV	6.44
Clay City	69/12.5 kV	14.00	Stanton	69/12.5 kV	20.00
Frenchburg	69/25/12.5 kV	11.20	Three Forks	138/25 kV	12.00
High Rock	69/7.2 kV	0.93	Trapp	69/12.5 kV	5.00
Hope	69/25 kV	6.44	Treehaven	69/12.5 kV	5.00
Hunt	69/25/12.5 kV	14.00	Union City	138/25 kV	12.00
Jeffersonville	69/25 kV	11.20	Van Meter	69/12.5 kV	6.44
Mariba	69/25/12.5 kV	5.60	Note: Preston is a customer-owned substation.		
A.O. Smith, Treehaven, Van Meter & Cave Run are radial KU. Blevins Valley & Mt. Sterling are radial EKP.					

Table No. 7 Summary of Recent and Proposed Major Substation and Transmission Projects		
Year	**Project**	**Comments**
1992	Dale-Powell Co. Line	A 25.82-mile 138 kV transmission line constructed between EKP Dale Power Station and Powell Co. Transmission Substation to improve bulk transmission capacity. Line runs adjacent to major natural gas pipeline pumping station which may convert from combustion to electric pumping.
	Three Forks Substation	New 138/25 kV distribution substation serving portions of Madison County. Substation constructed adjacent to existing Dale-Fawkes transmission line.
1995	J.K. Smith-Fawkes Line	A 15.17-mile 138 kV transmission line constructed between EKP J.K. Smith Power Station and KU's Fawkes Transmission Substation to improve bulk transmission capacity.
	Mariba Substation	New 69/25/12.5 kV distribution substation serving portions of Menifee County.
1996	Jeffersonville Substation	New 69/25 kV distribution substation serving portions of Montgomery County.
1997	Trapp Substation	New 69/12.5 kV distribution substation serving portions of Clark County and Powell County.
1999	Reid Village Substation	New 69/12.5 kV distribution substation serving portions of Montgomery and Clark County.
	Fogg Pike Switch	Installation of a normally open 69 kV switch between EKP and KU transmission. Contingency transmission service now available for Reid Village Substation. Radial transmission service to Mt. Sterling Substation reduced from 10.1- to 2.2-miles.
2001	High Rock Delivery Point	Single-phase 69 kV/7.2 kV platform-mounted delivery constructed to serve local single-phase load to replace the retired Sand Lick Substation in Powell County. Sand Lick was located in an isolated area of difficult terrain and formerly served many small oil and gas pumping facilities that have been retired from service.
	Treehaven Substation	New 69/12.5 kV distribution substation serving portions of Clark County.
	Blevins Valley Substation	New 69/25/12.5 kV distribution substation serving portions of Bath County.
2002	J.K. Smith-Lake Reba Line	A 15-mile 138 kV transmission line constructed between EKP J.K. Smith Power Station and KU's Lake Reba Transmission Substation. Line also serves new Union City Substation. See Union City Substation below.
	Union City Substation	New 138/25 kV distribution substation serving portions of Madison County. Substation constructed adjacent to J.K. Smith-Lake Reba line.
	Bowen-Powell County Line	Reconductor 5.95-miles of existing 69 kV transmission for single-contingency.
	Frenchburg-Mariba Line	Reconductor 4.03-miles of existing 69 kV transmission for single-contingency.
2003	Mariba-Maytown Line	Reconductor 6.76-miles of existing 69 kV transmission for single-contingency.
2004	Hinkston Substation	Replace A.O. Smith 5 MVA autotransformer bank served by 0.83 mile 69 kV transmission line operating at 12.5 kV with proposed 69/25 kV, 11.2 MVA rated distribution substation. See Section 6 for discussion.
	Hardwicks Creek Substation	Proposed 69/25/12.5 kV, 5.6 MVA rated distribution substation to serve portions of Powell County. See Section 6 for discussion.
	Miller Hunt Substation	Proposed 69/25 kV, 11.2 MVA rated distribution substation to serve portions of Clark County. See Section 6 for discussion.

2.4 Status of 1999-2003 Construction Work Plan Projects

A majority of system improvement and conductor replacement projects within the 1999-2003 CWP are complete or remain active. Active CWP projects include those where construction is underway or construction is pending negotiation and obtaining right-of-way from members. Several CWP projects have been deferred to the proposed 2003-2005 CWP because of limited loan funds available after the 1999-2003 CWP was amended for an automated meter reading (AMR) project. Other CWP projects were deferred pending construction of Hardwicks Creek Substation in 2004 (311, 317 and 606.04) and are included within the 2003-2005 CWP. Another project (318) is deferred pending re-evaluation of a future Olympia Springs Substation by 2008. The status of 1999-2003 CWP system improvement and conductor replacement projects is summarized within Table No. 8 below.

Table No. 8
Status of 1999-2003 CWP Projects

Code	Project	CWP	Actual	Complete	Active	Defer	Comments
201	Cat Ck-Cow Ck-High Rock	$60,954	$76,715	√			
202	Beech Fork-Rex Townsend Rd	$9,641		√			Sectionalizing project.
203	Log Lick-Snow Ck	$36,387	$78,921	√			
204	Hatton Creek-Caudill Rd	$9,641			√		Negotiating R/W.
205	Dry Fork-Ruckerville-Pilot View	$70,595			√		Negotiating R/W.
206	Hampton Ridge	$138,052		√			
301	Denniston Conversion	$358,404			√		25 kV work underway.
302	Jeffersonville-US460-Means	$91,170	$58,326	√			
303	Hope-Means Rd	$170,387	$105,725	√			
304	Spencer Rd	$326,382	$213,112	√			
305	Blevins Valley Rd	$279,481			√		25 kV work underway.
306	Fayette County	$149,485	$102,471	√			
307	Highway 213	$13,857	$5,522	√			
308	Dan Ridge	$120,413	$128,943	√			
309	Cat Creek	$131,916				√	Code 319 in new CWP.
310	Virden Ridge	$107,374	$101,988	√			
311	Happy Top	$144,188				√	Code 328, 329 in new CWP.
312	Black Creek	$42,183				√	Code 326 in new CWP.
313	Ewing Trail-North Bend	$90,501				√	Code 321 in new CWP.
314	Lower Paint Creek	$48,318				√	Code 322 in new CWP.
315	Furnace Mountain	$131,917				√	Code 320 in new CWP.
316	Charlie Norris-Four Mile	$67,492			√		Negotiating R/W.
317	Happy Top-Hwy 82-Adams Br	$229,616				√	Code 324, 325 in new CWP.
318	Highway 36-Olympia	$378,112				√	Olympia Springs Substation.
319	Bowen School-Cat Creek	$137,286				√	Code 332 in new CWP.
320	Replace UD-Rockwell Village	$31,680				√	Monitoring for deterioration.
321	Replace UD-Twin Knobs	$269,280				√	Monitoring for deterioration.
322	Replace UD-Van Village	$1,056		√			Code 100 & 602 work.
323	Town Branch-New Cut	$230,088	$217,064	√			CWP amendment project.
606.02	Spencer Rd	$258,156	$340,814	√			
606.03	Highway 213	$59,850	$99,180	√			
606.04	Adams Br-Highway 82	$20,017				√	Code 325 in new CWP.
606.05	McCausey Ridge	$55,307	$96,253	√			
606.06	Big Hardwicks Ck	$12,285				√	Monitor for deterioration.

3 Review of 2002 Power Requirements Study

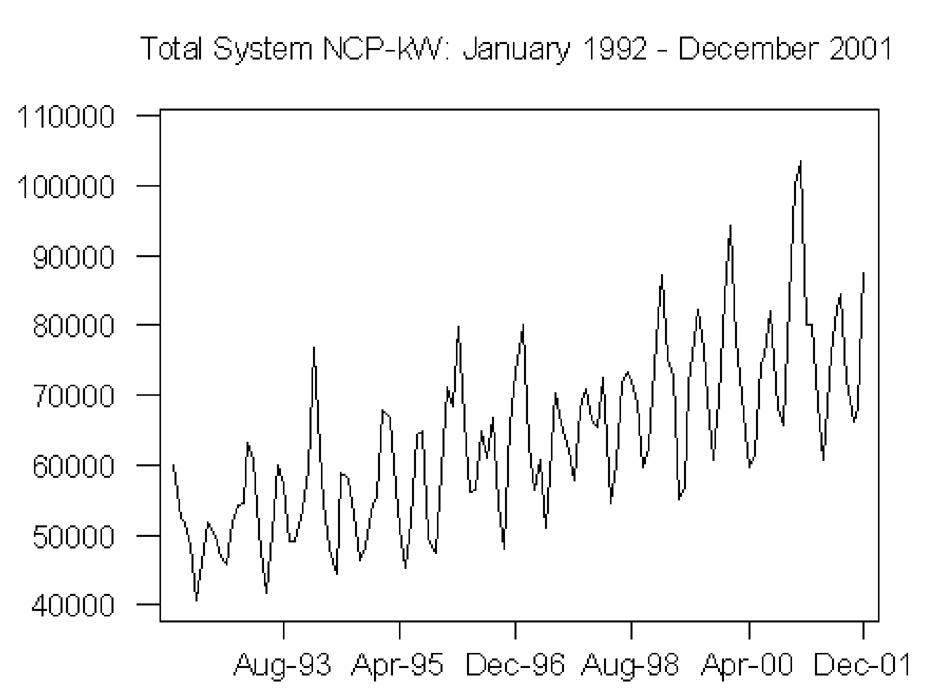
The 2002 Power Requirements Study (PRS) load forecast is a key foundation study for developing a reliable least cost distribution system. Clark's Board of Directors approved the 2002 PRS in summer 2002 as a guide for anticipating future member needs and load growth. RUS has traditionally required borrowers use the PRS load forecast to develop a twenty year LRP as a foundation study to prepare a series of CWPs and recommended system improvement projects. Planning horizons of twenty years are impractical for prioritizing today's business challenges except where present value least cost must be evaluated between various substation and distribution alternatives. Otherwise, a five-year planning horizon offers a better management tool to more frequently assess anticipated present and long-term distribution needs. PRS forecast uncertainty in a five-year planning horizon is significantly less than a twenty year planning horizon. Clark management participates with EKP staff to revise the PRS every two years. So, Clark's future CWPs will be based on LRPs formally revised every five year since RUS encourages borrowers base all system planning studies on a current load forecast. Future CWPs based on a LRP revised every five years and a PRS prepared bi-annually allows load growth trends be more closely monitored and member needs be addressed more frequently using better quality information.

The 2002 PRS presents Clark's normal winter and summer peak load forecast each year through 2023. Criteria used to develop the PRS include historical load growth patterns, member end-use data, demographic considerations and regional economic trends. The PRS includes the effects of "normal" or seasonal temperatures on projected "normal" or seasonal winter and summer loads. Normal winter and summer temperatures are defined as -4^{o} F and 94^{o} F respectively with a fifty-percent probability of occurrence. Planning utility facilities solely for projected normal winter and summer loads, however, often yields little or no additional capacity to serve peak loads during unseasonably warm and/or cold weather. So, distribution and substation facilities are designed to serve anticipated peak load.

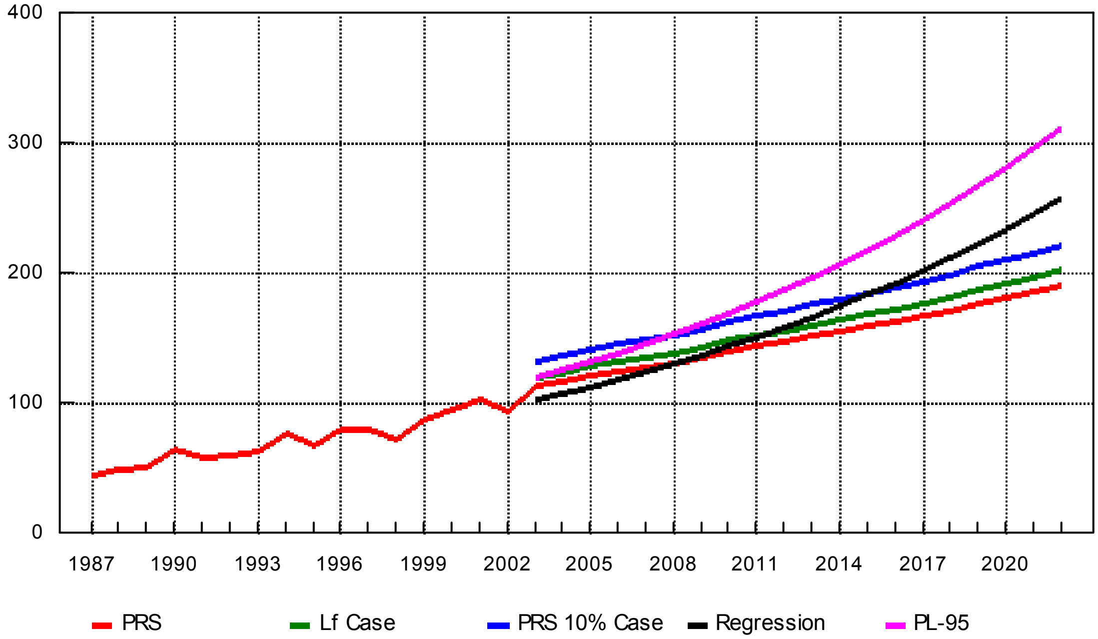
EKP and Clark use an adjusted PRS load forecast in joint planning activities to account for greater loads anticipated during unseasonably cold winter and warm summer temperatures. Specifically, the adjusted PRS load forecast is the normal load response to temperatures of -17^{o} F (winter) and 100^{o} F (summer) occurring with a ten-percent probability. The adjusted PRS is referred to as the "ten-percent case" for projecting unseasonable winter and summer loads annually through 2023 with a ten-percent chance of occurrence. EKP and Clark joint system planning of transmission, substation delivery points and distribution facilities relies on ten-percent load forecasts to ensure adequate capacity is available. So, a ten-percent case design load forecast for individual substations are prepared based on historical summer and winter trends of substation load growth. Projected substation loads are based on unity power factor during winter and the lowest power factors recorded at each substation during the most recent summer.

A statistically significant time series regression model of seasonal variation and trend was prepared to verify that selection of ten-percent case winter and summer design loads is reasonable. A review of historical system demand in the graph below illustrates that Clark's winter peak demand exhibits more variability than summer peaks. The overall load growth trend is also increasing. A time series multiple regression model is a useful tool for anticipating variations in winter and summer peaks supplementing the 2002 PRS. A 95-percent prediction limit provided by the multiple regression model coincides well with variations in historical winter peaks. The 95-pecent prediction limit for summer demand, however, yields a wider variation than is observed in historical summer peaks. A review of regression prediction limits confirms that relying on a regression fit model or a PRS normal winter and summer load forecast will underestimate winter and summer load at extreme temperatures. Prediction limits provided by the multiple regression approach tracks reasonably well the ten-percent case within the 2002 PRS during the planning horizon of the LRP. The prediction limits are more conservative, i.e. higher than the PRS ten-percent case forecast beyond the LRP planning horizon. So, adopting the PRS ten-percent case as a basis for LRP, CWP and substation evaluation design loads is reasonable since these forecasts are higher than "normal", but less than the prediction limits.

Graphs of historical peak demands and forecast demands for both winter and summer seasons are provided on the following page. The ten-percent case for winter and summer demand is illustrated to be a moderate forecast. This approach yields a forecast 152.79 MW and 124.79 MW design load by winter 2007-2008 and summer 2008 respectively within the planning horizon of the LRP. Similarly, a forecast 141.66 MW and 116.68 MW winter and summer design load is adopted for the CWP. Application of these design loads in the LRP, CWP and new substation planning studies is discussed in Section 4.

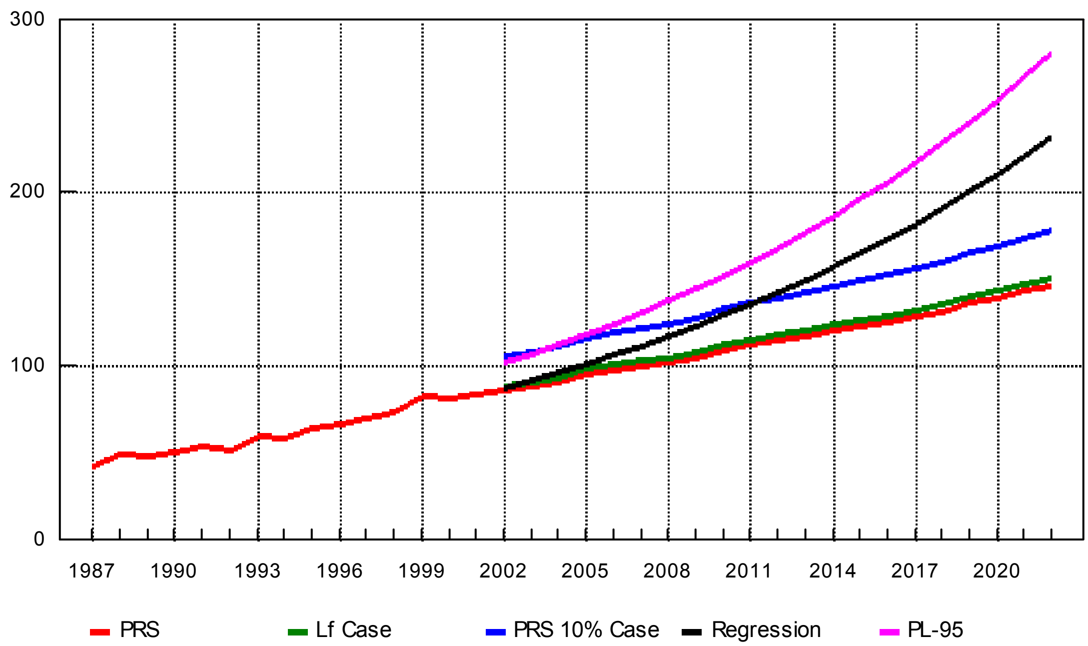


Projected Winter NCP-MW Demand



Actual Data Through December 2001

Projected Summer NCP-MW Demand



Actual Data Through December 2001

4 Preparation of LRP, CWP and Substation Evaluation Design

Preparation of the LRP, CWP and evaluation of proposed substations depends on development and application of a variety of uniform design criteria. Design criteria are essential to prepare the necessary system models to assess distribution needs and propose recommendations. Preparing LRP, CWP and substation evaluation planning models first requires the development of design loads and allocation of those peak demands to substation delivery points for the specific planning horizon under consideration. A variety of operational, sectionalizing, loading, reliability and economic criteria are next considered and applied to develop a consistent evaluation of LRP recommendations, CWP needs and new substations.

4.1 System Design Load

Winter and summer design loads used in preparation of the LRP, CWP and substation evaluation planning studies are obtained from the 2002 PRS ten-percent case. Each of these studies is a guide for evaluating a reliable least cost distribution system within a planning horizon appropriate with load forecast uncertainty and financial risks associated with some projects. The five-year planning horizon used to develop LRP recommendations has relatively little uncertainty associated with a ten-percent case design load. Similarly, a shorter horizon within the CWP action plan to begin implementing LRP recommendations has little forecast uncertainty. Financial risks and load forecast uncertainty cannot be reasonably evaluated for proposed transmission, substation and distribution alternatives with short planning horizons. So, all proposed substations are evaluated over a twenty-year period to ensure the best alternative is selected. Table No. 9 below summarizes the design load and planning horizons used within all LRP, CWP and substation studies.

Table No. 9
Summary of Planning Study Horizons and Design Loads

Planning Study	Horizon	Winter Design Load	Summer Design Load
2008 LRP	Five (5) Years	152.79 MW, Winter 2007-2008	124.79 MW, Summer 2008
2003-2005 CWP	Three (3) Years	141.66 MW, Winter 2004-2005	116.68 MW, Summer 2005
Substation Evaluation	Twenty (20) Years	See Table No. 12, pg 15	See Table No. 12, pg 15

4.2 Substation Demand Allocations

Winter and summer design loads are used to allocate PRS forecast noncoincident demands to all substation delivery points. The relative growth allocation factor for a given substation is the ratio of load growth of that particular station to total system growth. A compounded growth rate is developed for each substation to project individual substation loads. The sum of winter and summer substation loads is the system design load for winter and summer respectively. All demand loading allocations developed for each substation for winter and summer design loads are illustrated in Tables No. 12 on page 15. Percent loading of base and extended transformer MVA ratings is included. A substation 2003-2023 load forecast developed from the PRS is provided within Section 9, Appendix.

Table No. 10
Substation Historical Winter Loading in Megawatts (MW)

Delivery Point	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	MVA	Rating	Loading	Comments
A.O. Smith	1.47	1.31	1.37	1.58	1.90	1.87	1.81	2.12	2.35	2.19	3.00	4.48	49%	Proposed for 2004 replacement by new Hinkston Substation.
Blevins Valley										2.66	5.60	8.35	32%	Installed winter 2001 to serve part of Hope load.
Bowen	2.64	2.78	3.31	3.29	3.32	3.34	3.42	3.50	3.78	3.92	5.75	7.45	53%	
Cave Run	0.91	0.95	1.31	1.07	1.55	1.30	1.19	1.46	1.70	1.61	2.00	2.99	54%	
Clay City	4.52	6.83	8.41	7.60	8.56	8.30	8.47	9.59	10.74	11.28	14.00	18.14	62%	
Frenchburg	5.89	6.82	8.44	7.06	5.71	5.77	5.18	6.40	7.31	8.20	11.20	18.14	45%	
Hardwicks Ck														Proposed for 2004 to serve part of Clay City load.
High Rock										0.49	0.93	1.39	35%	Installed summer 2001 to serve part of Bowen load.
Hinkston														Proposed for 2004 to replace A.O. Smith delivery point.
Hope	4.49	5.51	6.83	5.94	7.43	5.58	4.86	6.25	6.91	7.23	6.44	8.35	87%	Substation upgraded to 11.2 MVA, 24.9 kV in fall 2002.
Hunt	14.29	8.88	11.42	9.39	11.15	10.82	7.65	9.44	9.83	11.87	14.00	18.14	65%	
Jeffersonville						3.38	3.43	4.08	4.76	5.13	11.20	18.14	28%	Installed summer 1996 to serve part of Mt. Sterling & Hope load.
Mariba					3.08	3.21	2.95	3.72	3.82	3.37	5.60	8.35	40%	Installed summer 1995 to serve part of Frenchburg load.
Miller Hunt														Proposed for 2004 to serve part of Hunt & Reid Village load.
Mt. Sterling	6.35	5.96	7.73	6.71	8.15	7.04	5.69	4.11	4.53	4.77	11.20	18.14	26%	
Preston	1.43	1.45	1.51	1.47	1.46	1.45	1.58	1.50	1.52	1.56	NA	NA	NA	Customer-owned substation.
Reid Village								2.75	3.13	3.22	5.60	8.35	39%	Installed winter 1999 to serve part of Mt. Sterling load.
Sand Lick	0.07	0.07	0.07	0.01	0.00	0.00	0.00	0.00	0.00		0.75	1.12		Retired and replaced by High Rock delivery point.
Sideview	3.50	3.58	4.79	3.95	4.63	4.89	4.12	5.29	5.37	5.72	6.44	8.35	69%	
Stanton	9.60	8.90	9.82	9.06	9.73	9.56	8.99	9.78	10.20	10.33	20.00	31.05	33%	
Three Forks		6.02	7.19	5.97	7.55	7.94	7.23	9.26	9.72	10.91	12.00	24.84	44%	Installed summer 1992 to serve part of Hunt load.
Trapp							0.98	2.07	2.31	2.61	5.00	7.45	35%	Installed summer 1997 to serve part of Hunt load.
Treehaven										3.83	5.00	8.35	46%	Installed summer 2001 to serve part of Van Meter load.
Union City											12.00	24.84		Installed summer 2002 to serve part of Three Forks load.
Van Meter	4.80	4.44	4.84	4.91	5.62	5.65	5.22	6.04	6.52	2.68	6.44	8.35	32%	
Totals	59.94	63.48	77.04	68.00	79.83	80.10	72.75	87.34	94.49	103.55	163.40	253.64		
Load Factor	48.2%	49.4%	41.2%	49.8%	46.2%	45.8%	53.2%	46.1%	45.2%	44.2%				

Note: EKP owns and maintains all substations. "MVA" is standard nameplate open-air 55°C or 65°C ratings. "Ratings" is extended rating available per IEEE standards. Loading is percent of "Rating".

Table No. 11
Substation Historical Summer Loading in Megawatts (MW)

Delivery Point	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	MVA	Rating	Loading	Comments
A.O. Smith	1.40	1.44	1.41	1.57	1.68	1.51	1.88	1.99	2.16	1.91	3.00	2.65	72%	Proposed for 2004 replacement by new Hinkston Substation.
Blevins Valley										2.58	5.60	6.27	41%	Installed winter 2001 to serve part of Hope load.
Bowen	2.40	3.01	3.20	3.01	3.40	3.62	3.85	4.21	4.28	4.31	5.75	5.60	77%	
Cave Run	0.64	0.78	0.79	0.86	0.82	1.28	1.01	1.20	0.95	1.02	2.00	1.76	58%	
Clay City	4.39	6.66	6.67	7.57	7.45	8.14	8.61	9.62	9.65	10.04	14.00	13.62	74%	
Frenchburg	4.99	5.98	6.26	4.75	4.57	5.31	5.42	6.32	6.39	7.02	11.20	13.62	52%	
Hardwicks Ck														Proposed for 2004 to serve part of Clay City load.
High Rock										0.48	0.93	1.04	46%	Installed summer 2001 to serve part of Bowen load.
Hinkston														Proposed for 2004 to replace A.O. Smith delivery point.
Hope	4.63	5.34	5.14	5.74	5.20	4.80	5.09	5.93	5.67	3.71	6.44	6.27	59%	Substation upgraded to 11.2 MVA, 24.9 kV in fall 2002.
Hunt	6.16	7.18	6.72	7.81	7.58	6.79	6.79	7.55	7.34	7.34	14.00	13.62	54%	
Jeffersonville					2.50	3.43	3.31	3.70	4.00	4.04	11.20	13.62	30%	Installed summer 1996 to serve part of Mt. Sterling & Hope load.
Mariba				2.39	2.67	2.45	2.51	3.02	2.82	2.55	5.60	6.27	41%	Installed summer 1995 to serve part of Frenchburg load.
Miller Hunt														Proposed for 2004 to serve part of Hunt & Reid Village load.
Mt. Sterling	5.41	6.05	6.35	6.93	6.12	5.94	6.48	4.26	4.21	4.27	11.20	13.62	31%	
Preston	1.42	1.48	1.50	1.43	1.44	1.46	1.50	1.56	1.53	1.56	NA	NA	NA	Customer-owned substation.
Reid Village								3.18	3.15	3.28	5.60	6.27	52%	Installed winter 1999 to serve part of Mt. Sterling load.
Sand Lick	0.06	0.05	0.02	0.00	0.00	0.00	0.00	0.00			0.75	0.66		Retired and replaced by High Rock delivery point.
Sideview	2.41	2.73	2.79	3.02	3.24	3.34	3.64	3.73	4.01	3.91	6.44	6.27	62%	
Stanton	10.90	11.49	10.49	11.24	11.62	12.09	12.04	13.08	12.94	13.18	20.00	24.00	55%	
Three Forks	3.54	3.87	3.73	4.34	4.37	4.75	5.12	5.76	6.38	6.17	12.00	19.20	32%	Installed summer 1992 to serve part of Hunt load.
Trapp						1.05	1.26	1.85	1.90	1.97	5.00	5.60	35%	Installed summer 1997 to serve part of Hunt load.
Treehaven										3.06	5.00	6.27	49%	Installed summer 2001 to serve part of Van Meter load.
Union City											12.00	19.20		Installed summer 2002 to serve part of Three Forks load.
Van Meter	3.80	4.01	3.95	4.33	4.12	4.37	4.95	5.44	4.51	2.20	6.44	6.27	35%	
Totals	52.13	60.05	59.01	65.00	66.77	70.32	73.46	82.40	81.89	84.60	163.40	191.02		
Load Factor	48.2%	49.4%	41.2%	49.8%	46.2%	45.8%	53.2%	44.9%	45.2%	44.2%				

Note: EKP owns and maintains all substations. "MVA" is standard nameplate open-air 55°C or 65°C ratings. "Ratings" is extended rating available per IEEE standards. Loading is percent of "Rating".

Table No. 12
Projected Substation Winter and Summer Loading in Megawatts (MW)

Delivery Point	Winter Loading Scenarios						Summer Loading Scenarios						Comments
	MVA	Rating	CWP	Loading	LRP	Loading	MVA	Rating	CWP	Loading	LRP	Loading	
A.O. Smith													Proposed for 2004 replacement by new Hinkston Substation.
Blevins Valley	5.60	8.35	3.93	47%	4.34	52%	5.60	6.27	3.70	59%	4.06	65%	
Bowen	5.75	7.45	5.29	71%	5.59	75%	5.75	5.60	5.82	104%	6.12	109%	Anticipate switching some distribution load to avoid upgrade.
Cave Run	2.00	2.99	2.29	76%	2.47	83%	2.00	1.76	1.42	80%	1.53	87%	
Clay City	14.00	18.14	13.15	73%	14.52	80%	14.00	13.62	11.83	87%	12.99	95%	Hardwicks Creek Substation assumes part of load in 2004.
Frenchburg	11.20	18.14	12.37	68%	13.79	76%	11.20	13.62	10.18	75%	11.29	83%	
Hardwicks Ck	5.60	8.35	3.64	44%	4.07	49%	5.60	6.27	2.60	41%	2.91	46%	Proposed for 2004 to serve part of Clay City load.
High Rock	0.93	1.39	0.67	48%	0.70	51%	0.93	1.04	0.65	62%	0.68	65%	
Hinkston	11.20	18.14	3.06	17%	3.29	18%	11.20	13.62	2.64	19%	2.83	21%	Proposed for 2004 to replace A.O. Smith delivery point.
Hope	6.44	8.35	6.76	81%	7.46	89%	6.44	6.27	5.31	85%	5.83	93%	Substation upgraded to 11.2 MVA, 24.9 kV in fall 2002.
Hunt	14.00	18.14	11.55	64%	12.11	67%	14.00	13.62	6.76	50%	7.03	52%	Miller Hunt Substation assumes part of load in 2004.
Jeffersonville	11.20	18.14	7.98	44%	9.04	50%	11.20	13.62	5.97	44%	6.72	49%	Jeffersonville now has a 11.2 MVA power transformer.
Mariba	5.60	8.35	4.26	51%	4.37	52%	5.60	6.27	3.32	53%	3.39	54%	
Miller Hunt	11.20	18.14	5.60	31%	6.00	33%	11.20	13.62	3.98	29%	4.26	31%	Proposed for 2004 to serve part of Hunt & Reid Village load.
Mt. Sterling	11.20	18.14	6.58	36%	7.03	39%	11.20	13.62	5.85	43%	6.22	46%	
Preston	NA	NA	1.85	NA	1.84	NA	NA	NA	1.95	NA	1.93	NA	Customer-owned substation.
Reid Village	5.60	8.35	3.27	39%	3.49	42%	5.60	6.27	3.65	58%	3.88	62%	Miller Hunt Substation assumes part of load in 2004.
Sideview	6.44	8.35	7.97	96%	8.55	102%	6.44	6.27	5.39	86%	5.75	92%	Anticipate switching some distribution load to avoid upgrade.
Stanton	20.00	31.05	13.01	42%	13.31	43%	20.00	24.00	17.07	71%	17.38	72%	
Three Forks	12.00	24.84	8.34	34%	9.20	37%	12.00	19.20	4.57	24%	5.01	26%	
Trapp	5.00	7.45	3.51	47%	3.70	50%	5.00	5.60	2.66	48%	2.80	50%	
Treehaven	5.00	8.35	5.20	62%	5.51	66%	5.00	6.27	4.15	66%	4.38	70%	
Union City	12.00	24.84	7.75	31%	8.55	34%	12.00	19.20	4.25	22%	4.66	24%	
Van Meter	6.44	8.35	3.64	44%	3.85	46%	6.44	6.27	2.98	48%	3.14	50%	
Totals	188.40	303.58	141.66		152.79		188.40	229.24	116.68		124.79		

Note: "MVA" is standard nameplate open-air 55°C or 65°C ratings. "Ratings" is extended rating available per IEEE standards. Loading is percent of "Rating".
Winter loading scenarios in CWP and LRP columns above are design loads anticipated by winter 2004-2005 and winter 2007-2008 respectively.
Summer loading scenarios in CWP and LRP columns above are design loads anticipated by summer 2005 and summer 2008 respectively.

4.3 Distribution System Model

Clark's distribution system is modeled with AutoDesk GenMAP™ and Milsoft WindMil™ software. All substation design loads are distributed or allocated to each feeder model. Demand allocations to feeders are proportionately allocated by a ratio of total customer demand and energy metered within a circuit to total substation demand. Circuit demand is then distributed to individual line sections within the model. Demand allocations to line sections are similarly developed by proportionately allocating the ratio of total member demand and energy metered in a line section to total circuit demand. Load allocation methodologies generally assume members' coincident substation demand is proportional to energy after discounting spot loads. Demand coincidence factors, however, varies with customer class. Adjustments are made to distributed demands where coincidence is reasonably estimated.

A load flow analysis of each circuit model is prepared from the allocation of substation design loads to individual feeders and line sections. A typical load flow analysis includes conductor loading, losses, power factor, and voltage levels at each feeder line section. The baseline analysis without any system improvements is initially developed for each feeder model to reflect both summer and winter seasons. A load flow analysis is then developed to illustrate the effect of all recommended system improvement projects and changes.

4.4 Voltage Criteria

A distribution primary load flow analysis of all feeders is initially reviewed for consistency with a variety of design criteria. Design criteria typically include considerations governing conductor loading, voltage levels, losses and power factor, sectionalization and reliability. Phase balance and economic considerations similarly contribute to a review of the initial load flow analysis. Voltage levels, however, are generally the most limiting criteria when determining the adequacy of the distribution system at the design load. RUS recommends a maximum 8-Volt drop criterion between all regulated busses and line sections throughout the primary distribution system. Application of the RUS 8-Volt drop criteria in conjunction with other design criteria generally determines the most practical and preferred option to maintain voltage levels. Options generally include voltage conversion, circuit conversion, switching and/or the application of voltage regulators and capacitor banks depending on the scope and severity of voltage-related problems.

Regulation devices such as voltage regulators and capacitors may be applied at circuit locations where voltage levels exceed the 8-Volt drop criteria. RUS recommends that planning studies address permanent improvements for voltage drops of 16-Volts or greater in lieu of installing more than one tier of voltage regulation. Application of two tiers of line voltage regulators is recognized as a temporary measure. All voltage level calculations within the LRP, CWP and substation evaluation analysis are inclusive of any installed voltage regulators and capacitor banks. Regulated busses are assumed to be maintained at 126-Volts within all distribution models. Capacitor banks are evaluated to minimize distribution losses and avoid wholesale power factor billing at all locations.

4.5 Sectionalizing Criteria

An objective of Clark's ongoing sectionalizing program is to improve distribution system reliability. System protection schemes are updated on an ongoing basis as circuit conditions change with load growth. Electronically controlled distribution equipment regularly provides data on the performance of system protection schemes and devices. Pole ground impedance data is obtained from the field as needed to provide an indication of the maximum fault impedance yielding the minimum design fault current. Sectionalizing design criteria used to develop system protection schemes are summarized within Table No. 13 below.

Table No. 13
Circuit Sectionalizing Criteria

Coordination Philosophy	Eliminate simultaneous protective device operations on three-phase circuits. Minimize or eliminate simultaneous operation of single-phase reclosers by alternating series trip coil sizes. Compromise device coordination only within the last single-phase protection zone, transformer banks and capacitor banks where possible.
Protection Zones	Reduce circuit exposure with additional protective devices. Devices are spaced 2.5 to 5.0 miles (3.0 to 3.5 miles avg.) apart depending on local circuit topology and operating circumstances.
Fault Currents & Equipment Ratings	Min. fault currents are based on a 40 ohm fault impedance. Min. fault currents based on a 30-ohm fault impedance may be used only in unique circumstances within RUS specifications. Ground-sensing three-phase equipment is installed when min. fault currents are 140 Amps or less within a given zone of protection. All protective devices and equipment are rated for available load currents and available max. and min. fault currents.
Three-Phase Reclosers	All three-phase reclosers are electronically controlled, fully programmable with sequence coordination and ground-fault sensing for improved coordination. All reclosers are programmed with a min. trip 2 to 2.5 times peak load current.
Single-Phase Reclosers	Single-phase reclosers are sized so that continuous series trip coil ratings are limited to about 125% of peak load to account for transformer magnetizing inrush. Hydraulically controlled single-phase reclosers are limited in coil ratings from 25 to 70 Amps. 100 Amp hydraulically-controlled reclosers may be installed where fault current is sufficiently high to ensure a reliable trip. Circuit improvements to improve phase balance are considered when line current exceeds 56 Amps, which is 80% continuous rating of a 70 Amp hydraulic recloser. Single-phase hydraulically controlled reclosers are installed in series by alternating continuous trip coil ratings to avoid simultaneous operations. Electronically controlled single-phase reclosers with higher interrupting capability and sequence coordination are installed at locations with high fault currents and/or where successful coordination is essential.
Single-Phase Circuit Protection	Standard fuse sizes are primarily 6 Amps. Larger fuse sizes are permissible provided proper coordination with three-phase reclosers does not yield any fast curve operations. All single-phase taps off of three-phase feeders are fused or a single-phase recloser is installed. Single-phase reclosers may be installed subject to tap exposure, numbers of consumers involved and fuse size limitations.
Fuse Selection	Type T fuses are a standard to provide proper coordination with other devices. Cutout-type current limiting fuses may be used in areas of high fault currents on single-phase taps with low exposure and/or low number of consumers.
Electronic Sectionalizers	Electronic sectionalizers are installed to extend the range of coordination on single-phase taps where standard devices cannot offer reliable coordination. Installation depends on local unique operating circumstances, exposure and number of consumers affected.
Equipment & Wire Protection	Conventional transformers and capacitor banks are fused in accordance with manufacturer and/or ANSI specifications for adequate load carrying capability and overcurrent protection. Conventional transformers with fuse cutouts are preferred for installation in all areas to isolate failed transformer arresters. All proposed coordination is reviewed against equipment and conductor damage curves.
Switches	Disconnect switches are installed between all recloser locations for improved sectionalization and faster service restoration. Install three-phase gang-operated switches on major interties.
Surge Arresters	Approx. five (5) surge arresters per mile of three-phase line are installed to provide improved insulation coordination and limit recloser operations caused by power follow through currents.

4.6 Conductor Loading Criteria

Conductor loading is closely related to voltage and sectionalizing criteria. Voltage drop criteria are more likely to be a constraint before thermal loading limits are exceeded on typical distribution circuits. Similarly, sectionalizing criteria require that circuit conversions be considered when single-phase line currents exceed 55 Amps. Conductor loading considerations, however, can be a limiting factor where feeders are well-regulated and sectionalizing criteria is not a factor. Conductor ampacity ratings used in all LRP, CWP and new substation evaluations are based on ten-percent case ambient conditions for winter (-17^{o}F) and summer (100^{o}F). This ambient winter temperature allows conductor ratings beyond a normal (25^{o}C or 77^{o}F ambient) published ampacity. Alternately, this ambient summer temperature requires conductor ampacity be derated below published values. A primary conductor loading criteria applied throughout all planning studies is that winter or summer loading not exceed 80-percent or 50-percent of thermal rating for radial and intertie circuits respectively.

4.7 Reliability Centered Maintenance Criteria

Maintenance activities are one of the largest controllable costs on a typical distribution system. A reliability-centered maintenance (RCM) program is an effective way to minimize routine maintenance costs. RCM concentrates maintenance activities to avoid failures of distribution system components that lead to interruptions of electric service. Poles and conductors are two obvious distribution system components on which electric service reliability depends. Distribution poles can be tested to assess their mechanical strength and maintenance can be performed to extend their useful life. Distribution conductors, however, deteriorate over time because of wind vibration, wind-induced ice galloping, tree contacts, lighting, occasional heavy ice and high winds, over-tensioning, age and corrosion. Similarly, bare overhead conductors cannot be maintained (e.g. the galvanizing on steel core wires cannot be restored), but they can be repaired when broken. So, LRP and CWP design criteria includes a review or consideration of aging conductor and plans for eventual replacement.

Bare overhead copper conductor is among the oldest components in-service on Clark's distribution system. A definitive end-of-life date is not known, but older conductor may or may not be less reliable depending on their environment and history of operating conditions. Experience shows that replacing old and aging conductor, however, leads to improved and better reliability than repairing broken wires. So, a design criterion for replacing aging copper conductor will depend on outage frequency attributed to conductor failure, number of members served, cost, convenience and future growth. Specifically, a distribution circuit consisting of aging conductor where improvements are required to improve voltage and/or capacity will be a candidate for feeder reconstruction in lieu of 25 kV conversion.

4.8 Economic Criteria

An objective of LRP, CWP and new substation planning studies is to develop an economic analysis of the distribution system to identify the best least cost plan to serve anticipated design loads. System improvements and/or new substations are recommended to improve voltage levels, reduce excessive loading or phase imbalance and improve reliability consistent with the appropriate design criteria. The evaluated cost of proposed substations is compared against the evaluated cost of distribution system improvements. New substations are recommended where proposed transmission and station facilities are the best and least cost alternative to upgrading the existing distribution system. New conductor proposed for use in system improvement projects are evaluated with economic conductor loading selection criteria to ensure economical conductors are used to minimize total costs. Economic criteria necessary to prepare a substation evaluation or economic conductor loading analysis are inclusive of fixed costs associated with capital investment and variable costs associated with losses. An economic evaluation of these costs is developed to select the least cost substation alternative and/or conductor where appropriate, assuming all other design criteria are first satisfied. A similar evaluation governs capacitor placement based on losses.

Key evaluation factors used throughout all substation evaluations and economic conductor loading analysis are illustrated within Table No. 14 below. A uniform discount rate of 7.3-percent is applied to all present value evaluations. Fixed costs associated with all Clark and EKP facility capital investment are proportional to their respective fixed charge rates and are included in all new substation studies and economic conductor loading analysis. Clark's fixed cost rate is based on O&M, depreciation and an authorized rate of return or weighted average cost of capital that is a function of TIER. Capital costs for Clark's distribution construction costs and EKP transmission and substation costs are provided within Section 5. Losses within all new substation studies and economic conductor loading analysis are evaluated at EKP's projected avoided costs and Clark's PRS forecast average annual load factor. Similarly, growth rates used within all planning studies are obtained from the 2002 PRS.

Table No. 14
2002 Economic Evaluation Factors

Clark System Fixed Rate	16.58%	2004 Avoided Cost per kW	$101.86
EKP Substation Fixed Rate	10.90%	Avoided Cost Escalation	2.13%
EKP Transmission Fixed Rate	12.52%	Clark Facility Cost Escalation	2.33%
Evaluation Discount Rate	7.30%	EKP Facility Cost Escalation	2.43%
Power Factor	≥ 95%	PRS Load Growth Rate	2.74%

Note: Clark's 16.58% system cost rate is composed of 5.93% O&M, 3.00% depreciation and an authorized 7.65% return or weighted average cost of capital.

4.9 Economic Conductor Loading Analysis

An economic conductor loading analysis is developed to select the least cost or most economical circuit conductor minimizing total costs over the expected life of a project. Selection of an economical conductor is a function of a given load, load growth rate, the economics associated with facility capital costs, losses and associated escalation factors where appropriate. Fixed costs are proportional to the fixed charge or system cost rate on capital investment. Variable costs are a function of conductor loss and EKP's avoided power costs. An economic conductor loading analysis provides a circuit conductor comparison of total fixed and variable costs on a unit mile basis for a given range of load.

The economic conductor loading analysis confirms 336 ACSR is generally the most economical conductor selection for the widest range of feeder loads on Clark's distribution system. Results of the conductor loading analysis are illustrated in Table No. 15 below. The table identifies loading ranges yielding the lowest total costs for a variety of conductors. Loading ranges vary depending on primary voltage and anticipated load growth. Inventory and construction practices limit standard conductors to #2, 1/0, 336 ACSR and 795 ACSR. Single-phase construction with #2 ACSR is economical although 336 ACSR is used when future three-phase and feeder interties are anticipated. Conductor selection recommendations are followed after conductor candidates satisfy all other design criteria. Details of the economic conductor loading analysis are provided within Section 9, Appendix.

Table No. 15
Economic Conductor Loading Analysis

Conductor	**12.47 kV Loading Limits w/ Growth**	**24.9 kV Loading Limits w/ Growth**
#2 ACSR	Up to 700 kW.	Up to 1300 kW.
1/0 ACSR	701 kW - 1200 kW; Consider use of 336 ACSR.	1301 kW - 2400 kW; Consider use of 336 ACSR.
4/0 ACSR	Not economical for broad load range.	Not economical for broad load range.
336 ACSR	1201 kW - 3300 kW.	Greater than 2401 kW.
556 ACSR	Not economical for broad load range.	Not economical.
795 ACSR	Greater than 3301 kW.	Not economical.
Conductor	**12.47 kV Loading Limits w/o Growth**	**24.9 kV Loading Limits w/o Growth**
#2 ACSR	Up to 800 kW.	Up to 1600 kW.
1/0 ACSR	801 kW - 1500 kW; Consider use 336 ACSR.	1601 kW - 3000 kW; Consider use of 336 ACSR.
4/0 ACSR	Not economical for broad load range.	Not economical for broad load range.
336 ACSR	1501 kW - 4200 kW.	Greater than 3001 kW.
556 ACSR	Not economical for broad load range.	Not economical for broad load range.
795 ACSR	Greater than 4201 kW.	Not economical.

Note: All values apply for three-phase facilities. New single-phase is recommended to be #2 ACSR construction unless three-phase conversion is later anticipated. 1/0 or 336 ACSR conductor should be installed in such cases. Sectionalizing considerations generally limit single-phase loading to about 400 kW and 800 kW at 7.2 kV and 14.4 kV respectively.

5 Review of Facility Costs

A majority of LRP and CWP costs consists of routine service-related and O&M activities. Typical tasks and needs include those associated with new service construction, service upgrades, pole replacements, security lights, transformers and meters. Historical and projected costs for these routine needs within the LRP and CWP planning horizon are summarized within Table No. 16 below. Similarly, facility costs for all distribution construction and voltage conversions, new substations, substation additions and transmission lines are included. These facility costs are used in all substation evaluations, economic conductor loading analysis and distribution system improvements anticipated within LRP and CWP planning horizons.

Table No. 16
Review of Projected Facility Costs

Description	1999	2000	2001	Year Avg	CWP	LRP
New Member OH Construction						
New Services Constructed	721	595	529	616	1848	3696
Service Distance (Miles)	42.30	41.90	34.81	40.0	120.00	240.00
Cost of Constructed Services	$1,463,900	$1,355,034	$1,293,961	$1,370,965	$4,364,976	$9,136,512
Average Service Construction Cost	$2,030	$2,277	$2,446	$2,226	$2,362	$2,472
New Member UD Construction						
New Services Constructed	253	260	242	251	753	1506
Service Distance (Miles)	10.23	11.25	10.02	11.00	33.00	66.00
Cost of Constructed Services	$402,947	$521,399	$497,104	$473,817	$1,509,012	$3,156,576
Average Service Construction Cost	$1,593	$2,005	$2,054	$1,888	$2,004	$2,096
Increased Service Capacity						
No. of Service Capacity Increases	116	109	127	117	354	708
Cost of Entrance Changes	$88,837	$93,695	$113,729	$98,754	$329,220	$688,884
Average Cost of Entrance Changes	$766	$860	$896	$844	$930	$973
Security Lights						
No. of Security Lights Installed	579	480	459	506	1518	3036
Cost of Security Lights	$93,109	$111,170	$116,533	$106,937	$340,032	$710,424
Average Cost of Installation	$161	$232	$254	$211	$224	$234
Pole Replacements						
No. of Poles Replaced	376	231	479	362	1086	2172
Cost of Replacements	$287,281	$239,047	$449,312	$325,213	$1,034,958	$2,165,484
Average Cost of Replacements	$764	$1,035	$938	$898	$953	$997
Transformers						
No. of Transformers Installed	1171	1361	1183	1238	3714	7428
Cost of Transformers	$817,998	$1,050,966	$932,233	$933,732	$2,971,200	$6,217,236
Average Cost of Transformers	$699	$772	$788	$754	$800	$837
Meters						
No. of Meters Installed	1922	527	6511	2987	1900	6800
Cost of Meters	$187,075	$103,008	$721,389	$337,157	$233,700	$877,200
Average Cost of Meters	$97	$195	$111	$113	$123	$129

Projected Clark Energy Facility Costs (2004 Dollars)				**Projected EKP Facility Costs (2004 Dollars)**	
Description (3Φ)	**Cost / Mile**	**14.4 /25 kV**	**Cost / Mile**	15/20/25 MVA transformer addition.	$370,343
#2 ACSR / Mile	$64,050	Single-Phase	$7,637	11.2 MVA transformer addition.	$152,124
1/0 ACSR / Mile	$68,947	Two-Phase	$10,203	69 kV 3-way tap structure and switch	$37,769
4/0 ACSR / Mile	$76,216	Three-Phase	$12,767	69/24.9 kV, 11.2 MVA substation	$542,400
336 ACSR / Mile	$80,313			69/12.5 kV, 5.6 MVA substation	$395,522
556 ACSR / Mile	$91,547			12.5/24.9 kV 5 MVA autotrans bank	$62,948
795 ACSR / Mile	$99,716			69 kV subtransmission line ($/mile)	$192,410

6 Evaluation of Proposed Substations

Hardwicks Creek Substation and Miller Hunt Substation are recommended for construction in 2004 by EKP based on a substation evaluation developed by Clark. Both substations are more economical and reliable in lieu of upgrading the existing distribution system. Hardwicks Creek and Miller Hunt Substations will defer costly upgrades, are consistent with all design criteria, improve reliability and represent the least cost alternatives. The substation evaluation applies design criteria earlier presented in Section 4 and the 2002 PRS load forecast to assess distribution needs. Alternative models of the distribution system with and without the proposed substations are developed using these criteria and forecasts to economically evaluate one-system costs over a twenty-year period. A twenty-year planning horizon is appropriate for evaluating substations because of the financial risk associated with the investment. The evaluation also includes an economic reliability assessment from the members' perspective. Hardwicks Creek and Miller Hunt Substations limit distribution exposure to improve sectionalization, offer better contingency switching options and improve overall reliability compared to the existing system. So, the substation evaluation is a thorough analysis to reduce uncertainty and improve the quality of recommendations.

The proposed Hardwicks Creek Substation and Miller Hunt Substation are located in Powell County and Clark County respectively. A third proposed substation at Olympia Springs in Bath County was also considered and evaluated using the same design criteria, load forecasts and reliability considerations as the recommended substations. The Olympia Springs Substation, however, was evaluated not to be the least cost alternative at present compared to upgrading the existing distribution system and alternative plans associated with this station will not be presented. Aside from new substations being recommended based on Clark's evaluations, Clark and EKP have conferred about the future of the existing A.O. Smith Delivery Point. Refer to details about this delivery point earlier presented in Section 2.3, Transmission and Substation Facilities. Clark submitted to EKP a June 2002 report presenting options on the future of A.O. Smith. Clark's report requested EKP upgrade the facility because of limited autotransformer bank capacity or build a replacement substation. EKP has completed their review and will replace A.O. Smith with Hinkston Substation (69/24.9 kV, 11.2 MVA) on or adjacent to the same site as the existing facilities.

Substation evaluations for the proposed Hardwicks Creek and Miller Hunt Substations are developed to identify the best overall expansion plan to serve members more reliably at the least one-system cost. The following sections will present a review of this substation evaluation process by briefly summarizing application of all design and economic criteria including use of the 2002 PRS load forecast. Preparation of a substation evaluation requires application of common design criteria to competing alternative plans so that all economic and reliability comparisons are consistent. A brief overview of distribution system alternatives or competing plans with and without the proposed substations is next presented. Finally, a presentation is provided for results of a reliability assessment and an economic evaluation of the plans. A summary of the evaluation process follows with a recommendation that Hardwicks Creek and Miller Hunt Substations be constructed by EKP. All details of the substation evaluation are provided in the Appendix.

6.1 Application of Design Criteria

Preparation of a substation evaluation depends on uniform application of various design criteria. Design criteria are essential to prepare system models, assess distribution system needs and propose recommendations. Preparation of substation evaluation planning models first requires the application and allocation of design loads to delivery points for a specific planning horizon. A load flow analysis is used to assess distribution system performance against a variety of operational and economic design criteria at the design load for each alternative model under consideration. These design criteria earlier presented within Section 4 are summarized within Table No. 17 below.

<table>
<tr><th colspan="5">Table No. 17
Summary of Substation Evaluation Design Criteria</th></tr>
<tr><td>Design Loads</td><td colspan="4">All winter and summer design loads used in preparation of substation evaluations are obtained from the 2002 PRS ten-percent case. Winter and summer PRS system design loads are allocated to forecast noncoincident demands at all substation delivery points based on historical loads and growth rates. Published EKP power transformer loading criteria are used to assess all substation load forecasts. Reference Section 4.1 System Design Load, Section 4.2 Substation Demand Allocations and see Table No. 12 on pg 15 for CWP and LRP substation design loads. See Substation Forecast tab in appendix for a twenty-year substation load forecast with and without new stations based on 2002 PRS.</td></tr>
<tr><td>System Modeling</td><td colspan="4">Distribution system is modeled with AutoDesk GenMAP™ and Milsoft WindMil™ software. All substation design loads are distributed or allocated to each feeder model. Demand allocations to feeders are proportionately allocated by a ratio of total customer demand and energy metered within a circuit to total substation demand. Circuit demand is then distributed to individual line sections within the model. Demand allocations to line sections are similarly developed by proportionately allocating the ratio of total member demand and energy metered in a line section to total circuit demand. Load allocation methodologies generally assume members' coincident substation demand is proportional to energy after discounting spot loads. A load flow analysis of each circuit model is prepared from the allocation of substation design loads to individual feeders and line sections to investigate conductor loading, losses, power factor and voltage levels. Reference Section 4.3 Distribution System Model.</td></tr>
<tr><td>Voltage Levels</td><td colspan="4">RUS recommends a maximum 8-Volt drop criteria between all regulated busses and line sections throughout the primary distribution system. Regulation such as voltage regulators and capacitors may be applied at circuit locations where voltage levels exceed the 8-Volt drop criteria. RUS recommends that planning studies address permanent improvements for voltage drops of 16-Volts or greater in lieu of installing more than one tier of voltage regulation per RUS Bulletin 1724D-101A. Application of two tiers of line voltage regulation is recognized as a temporary measure. Regulated busses are assumed to be maintained at 126-Volts within all distribution models. Reference Section 4.4 Voltage Criteria.</td></tr>
<tr><td>Sectionalizing</td><td colspan="4">Circuit improvements to improve phase balance are considered when current exceeds 56 Amps, i.e. 80% continuous rating of a 70 Amp hydraulic recloser. Reference Section 4.5 Sectionalizing Criteria.</td></tr>
<tr><td>Conductor Loading</td><td colspan="4">Conductor ampacity ratings used within the substation evaluation are based on ten-percent case ambient conditions for winter (-17°F) and summer (100°F). This ambient winter temperature allows conductor ratings beyond a normal (25°C or 77°F ambient) published ampacity. Alternately, this ambient summer temperature requires conductor ampacity be derated below published values. A primary conductor loading criteria applied within the substation evaluation is that winter or summer loading not exceed 80% or 50% of thermal rating for radial and intertie circuits respectively per RUS Bulletin 1724D-101B. Reference Section 4.6 Conductor Loading Criteria.</td></tr>
<tr><td>Economic Loading</td><td colspan="4">An economic conductor loading analysis is developed to select the least cost or most economical circuit conductor minimizing total costs over the expected life of a project. Selection of an economical conductor is a function of a given load, load growth rate, the economics associated with facility capital costs, losses and associated escalation factors where appropriate. Reference Section 4.9 Economic Conductor Loading Analysis for recommended conductor selections at various load levels.</td></tr>
<tr><td rowspan="6">Economic Factors</td><td>Clark System Fixed Rate</td><td>16.58%</td><td>2004 Avoided Cost per kW</td><td>$101.86</td></tr>
<tr><td>EKP Substation Fixed Rate</td><td>10.90%</td><td>Avoided Cost Escalation</td><td>2.13%</td></tr>
<tr><td>EKP Transmission Fixed Rate</td><td>12.52%</td><td>Clark Facility Cost Escalation</td><td>2.33%</td></tr>
<tr><td>Evaluation Discount Rate</td><td>7.30%</td><td>EKP Facility Cost Escalation</td><td>2.43%</td></tr>
<tr><td>Power Factor</td><td>≥ 95%</td><td>PRS Load Growth Rate</td><td>2.74%</td></tr>
<tr><td colspan="4">Reference Section 4.8 Economic Criteria.</td></tr>
</table>

6.2 Hardwicks Creek Substation - Distribution System Alternatives

An overview of the existing system in the Hardwicks Creek Substation area is presented prior to presenting alternatives with and without the proposed substation on the next page. A schedule on pages 26-27 summarizes all proposed system improvements with and without the proposed substation. A USGS quad map section and facility map on pages 28-29 illustrates the geographical and distribution system location of the proposed substation. Economic evaluation results are presented in Section 6.5. Printouts of the load flow analysis are available as a separate document.

Overview of Existing System

A radial feeder from Clay City Substation serves all the Hardwicks Creek area of Powell County. The Hardwicks Creek area is readily accessible by KY 1057 extending south from KY 15 in Clay City, KY. Members residing throughout the Hardwicks Creek area near Clay City center on unincorporated communities, e.g. Big and Little Hardwicks Creek, Frames Branch and Happy Top. Clay City Dragway and Round Track, a popular regional auto racing venue, is also located at Hardwicks Creek. The area is attractive to developers since much of Hardwicks Creek lies along a broad valley and creek bearing its name extending south of Clay City with mountains on either side. Continued residential growth is anticipated because of easy access to the Mountain Parkway (and Interstate 64) and Clay City from KY 1057 that traverses the Hardwicks Creek area.

Member growth throughout the Clay City and Hardwicks Creek area led to construction of a third feeder from Clay City Substation in 1992 to serve increasing distribution loads. Similarly, adjoining feeders within the Clay City area were upgraded during the 1990s to assume additional load formerly served by the Hardwicks Creek feeder, i.e. Clay City Ckt 4. These upgrades have heretofore deferred other projects to improve capacity and voltage levels otherwise required along the KY 1057-Hardwicks Creek corridor. Continued growth based on the 2002 PRS forecast, however, will require a scheduled program of extensive distribution improvements on Clay City Ckt 4 to serve the Hardwicks Creek area beginning in 2004. Clay City Ckt 4 is comprised of 336 ACSR conductor for about 3.5-miles from Clay City Substation around the periphery of downtown Clay City to near the Mountain Parkway south of downtown. This feeder interconnects with other adjoining feeders in the immediate Clay City area. Clay City Ckt 4 becomes a radial 1/0 ACSR feeder system immediately south of Clay City before crossing the Mountain Parkway. The 1/0 ACSR section of the feeder extends an additional 4.8-miles with an overall three-phase feeder length of 8.2-miles from Clay City Substation.

Two alternative cases were developed within the substation evaluation to study competing plans without and with the proposed Hardwicks Creek Substation, i.e. Case 1 and Case 2 respectively. A conversion to 25 kV operation is not a practical alternative within the immediate Clay City area. So, only two alternatives are needed to develop a thorough evaluation. Both alternatives presented within the evaluation are developed to provide adequate capacity and voltage levels at design loads over the study period with reasonable reliability. Case 1 and 2 highlights are presented on the next page.

Case 1 - Upgrade Existing Facilities at 12.5 kV

Case 1 is the baseline plan of upgrading the existing distribution system without building Hardwicks Creek Substation. Design loads from the 2002 PRS ten-percent case anticipated for Clay City Ckt 4 serving Hardwicks Creek and parts of Clay City are summarized in the table below. A series of reconductoring and conversion projects totaling 16.3-miles is scheduled on the feeder over the study period to provide adequate distribution service meeting all evaluation operating, reliability, and design load criteria. Much of this work is early in the study period. This schedule of system improvements is adequate to meet all evaluation criteria for both normal and single contingency configurations in the immediate Clay City area. The feeder is a radial system south of Clay City. Anticipated load at Clay City Substation will exceed the transformer's summer 13.62 MVA rating by 2005 and the unit must be replaced with a 15/20/25 MVA unit. Another unit of equal size is needed by 2020. A schedule of all forecast distribution and substation improvements for this case is provided in Table 18 on page 26.

Description	Winter Design Loads		Summer Design Loads	
	2003-2004	2022-2023	2004	2023
Clay City Ckt 4	6.89 MW	13.48 MW	5.35 MW	10.61 MW
Clay City Substation	15.97 MW	31.22 MW	13.62 MW	26.71 MW

Case 2 - Construct Hardwicks Creek Substation

Case 2 is the alternative plan of constructing Hardwicks Creek Substation to defer most distribution and substation improvements otherwise needed to satisfy all the design criteria over the study period. The new substation is proposed to be a generic 5.6 MVA, 69/12.5 kV facility served by a transmission tap about 3.5 miles in length from EKP's Clay City-Stanton 69 kV subtransmission line. The proposed substation is located at or near the projected load center at the KY 1057-Frames Branch intersection. A delivery point at this location allows the long radial system be divided into four short feeders to defer most distribution and station improvements. Only 8-miles of reconductoring and conversion work is needed and much of it late in the study period. A new feeder for the southern Hardwicks Creek area is proposed for 25 kV conversion (15-miles) via autotransformers installed when the new substation is built. Clay City Substation upgrades are deferred from 2005 to 2010. Design loads from the 2002 PRS ten-percent case forecast for this alternative are summarized in the table below. A schedule of all forecast distribution and substation improvements for this case is provided in Table 19 on page 27.

Description	Winter Design Loads		Summer Design Loads	
	2003-2004	2022-2023	2004	2023
Clay City Ckt 4	3.05 MW	6.07 MW	2.74 MW	5.44 MW
Hardwicks Creek Ckt 1	0.50 MW	0.99 MW	0.41 MW	0.81 MW
Hardwicks Creek Ckt 2	2.52 MW	5.02 MW	1.77 MW	3.52 MW
Hardwicks Creek Ckt 3	0.49 MW	0.96 MW	0.32 MW	0.65 MW
Clay City Substation	12.47 MW	24.25 MW	11.12 MW	21.75 MW
Hardwicks Ck Substation	3.51 MW	6.98 MW	2.50 MW	4.97 MW

Table No. 18
Case 1 - System Improvements Without Hardwicks Creek Substation (2004 Dollars)

Year	Circuit	LS	Scope (kft)				Rationale (One or More)				Design Criteria	Unit Cost	Subtotal
			Conductor	Conversion	Reconductor	25 kV	Voltage	Balance	Capacity	Reliability			
2004	Clay City Ckt 4	525	6 ACWC to 336 ACSR	2.766			√	√	√		√	$80,313	$42,073
		5252	6 ACWC to 336 ACSR	5.788			√	√	√		√	$80,313	$88,040
		580	336 ACSR to 795 ACSR		2.760				√		√	$99,716	$52,124
		5801	336 ACSR to 795 ACSR		2.588				√		√	$99,716	$48,876
		576	4/0 ACSR to 795 ACSR		4.382				√		√	$99,716	$82,757
		5761	4/0 ACSR to 795 ACSR		2.396				√		√	$99,716	$45,250
		633	4 ACSR to 336 ACSR	6.427				√			√	$80,313	$97,760
		634	4 ACSR to 336 ACSR	5.677				√			√	$80,313	$86,352
		641	4 ACSR to 1/0 ACSR	3.730			√	√			√	$68,947	$48,707
		6411	4 ACSR to 1/0 ACSR	1.514			√	√			√	$68,947	$19,770
		6413	4 ACSR to 1/0 ACSR	6.780			√	√			√	$68,947	$88,534
		602	1/0 ACSR to 795 ACSR		2.680		√				√	$99,716	$50,613
		610	1/0 ACSR to 795 ACSR		2.065		√				√	$99,716	$38,999
2007	Clay City Ckt 4	574	336 ACSR to 795 ACSR		2.279				√		√	$99,716	$43,040
2008	Clay City Ckt 4	6414	4 ACSR to 1/0 ACSR	6.456			√				√	$68,947	$84,303
		6101	1/0 ACSR to 795 ACSR		4.601		√				√	$99,716	$86,893
2010	Clay City Ckt 4	6102	1/0 ACSR to 795 ACSR		2.548		√				√	$99,716	$48,121
		6336	4 ACSR to 336 ACSR	2.966				√			√	$80,313	$45,115
2012	Clay City Ckt 4	5763	336 ACSR to 795 ACSR		2.293		√				√	$99,716	$43,305
2013	Clay City Ckt 4	5765	336 ACSR to 795 ACSR		1.253		√				√	$99,716	$23,664
		5766	336 ACSR to 795 ACSR		1.246		√				√	$99,716	$23,531
2015	Clay City Ckt 4	635	1/0 ACSR to 795 ACSR		3.890		√				√	$99,716	$73,465
2020	Clay City Ckt 4	5253	6 ACWC to 336 ACSR	5.158				√			√	$80,313	$78,457
2021	Clay City Ckt 4	6341	4 ACSR to 336 ACSR	4.059			√	√			√	$80,313	$61,741
Total				51.321	34.981								$1,401,490

1. The "Scope" portion of the table summarizes the proposed conductor (if any) and the miles of conversion, reconductoring and/or 25 kV voltage conversion required for each project.
2. The "Rationale" portion of the table summarizes as a check mark (√) where the existing system fails to satisfy one or more design criteria and conditions the project will correct or improve. A "Voltage" √-mark means the existing system fails to satisfy the 8- and 16-Volt drop criteria with no more than one tier of line regulation presented in Section 4.4. A "Balance" √-mark means the existing system fails to satisfy the 56-Amp single-phase loading criteria presented in Section 4.5. A "Capacity" √-mark means the existing system fails to satisfy conductor loading criteria of 80-percent or 50-percent of thermal rating on radial and intertie circuits respectively presented in Section 4.6. A "Reliability" √-mark identifies that a project is needed to improve backfeed capabilities and/or aging conductor is recommended for replacement.
3. The "Design Criteria" portion of the table summarizes as a √-mark that a proposed project satisfies all design criteria presented in Section 4, "Preparation of LRP, CWP and Substation Evaluation Design".

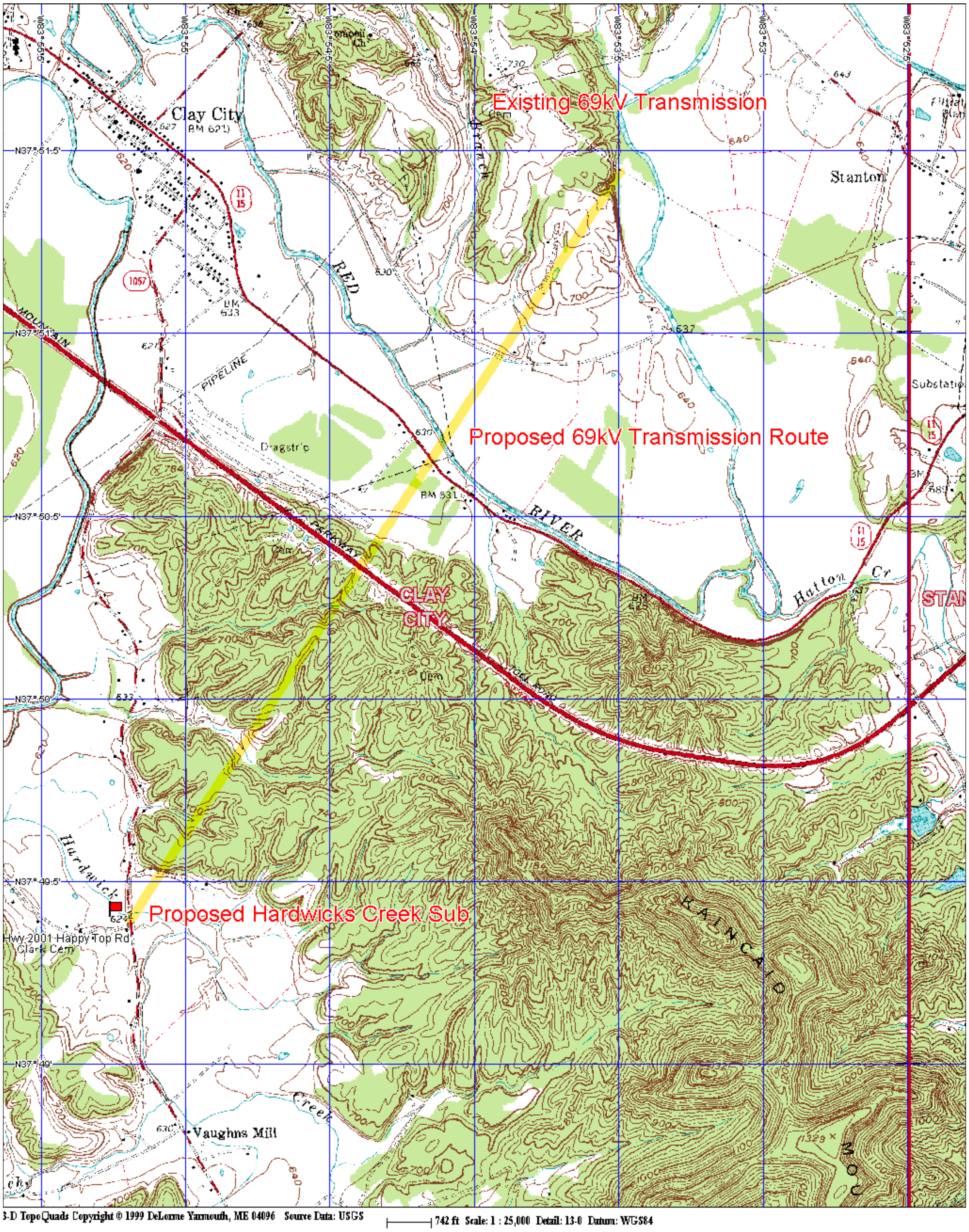
Year	Location	Scope of Substation & Transmission Improvements	Dist (kft)	Unit Cost	Subtotal
2005	Clay City Substation	Replace existing power transformer with 15/20/25 MVA rated unit for extreme summer peak.		$370,343	$370,343
2020	Clay City Substation	Add 2nd 15/20/25 MVA rated power transformer for extreme summer peak.		$370,343	$370,343
Total					$740,686

Table No. 19
Case 2 - System Improvements With Hardwicks Creek Substation (2004 Dollars)

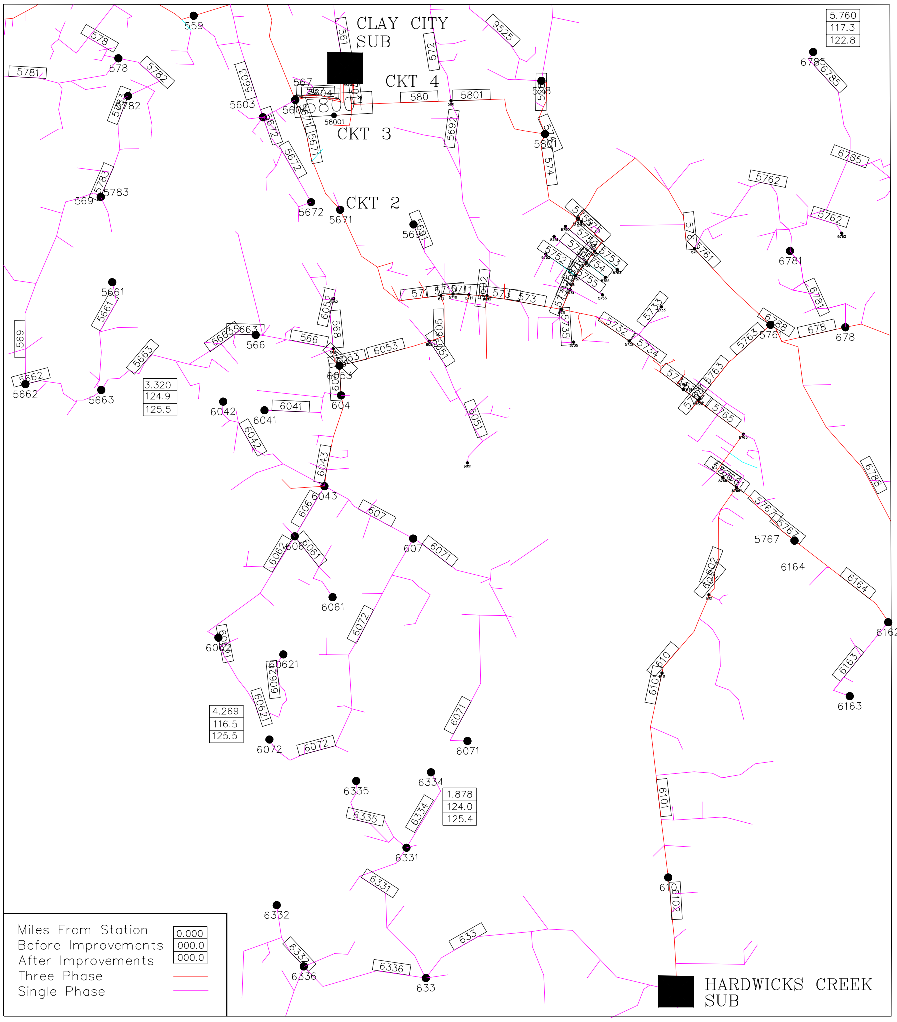
Year	Circuit	LS	Scope (kft)				Rationale (One or More)				Design Criteria	Unit Cost	Subtotal
			Conductor	Conversion	Reconductor	25 kV	Voltage	Balance	Capacity	Reliability			
2004	Clay City Ckt 4	525	6 ACWC to 336 ACSR	2.766				√			√	$80,313	$42,073
		5252	6 ACWC to 336 ACSR	5.788				√			√	$80,313	$88,040
2004	Hardwicks Creek Ckt 3	633	4 ACSR to 336 ACSR	6.427				√			√	$80,313	$97,760
2004	Hardwicks Creek Ckt 2	635	3Φ - 1/0 ACSR			3.890	√	√			√	$12,767	$9,406
		6361	3Φ - 1/0 ACSR			1.006	√	√			√	$12,767	$2,433
		6362	3Φ - 1/0 ACSR			0.958	√	√			√	$12,767	$2,316
		636-37	3Φ - 1/0 ACSR			2.505	√	√			√	$12,767	$6,058
		6372-3	3Φ - 1/0 ACSR			5.800	√	√			√	$12,767	$14,025
		634	1Φ - 4 ACSR			5.677	√	√			√	$7,637	$8,211
		6341	1Φ - 4 ACSR			4.059	√	√			√	$7,637	$5,871
		6363	1Φ - 2 ACSR			5.931	√	√			√	$7,637	$8,579
		6371	1Φ - 1/0 ACSR			2.806	√	√			√	$7,637	$4,059
		640	1Φ - 1/0 ACSR			6.691	√	√			√	$7,637	$9,678
		6401	1Φ - 1/0 ACSR			3.566	√	√			√	$7,637	$5,158
		641	1Φ - 4 ACSR			3.730	√	√			√	$7,637	$5,395
		6411	1Φ - 4 ACSR			1.514	√	√			√	$7,637	$2,190
		6413	1Φ - 4 ACSR			6.780	√	√			√	$7,637	$9,807
		6414	1Φ - 4 ACSR			6.456	√	√			√	$7,637	$9,338
		6412	1Φ - 4 ACSR			6.736	√	√			√	$7,637	$9,743
		6342	1Φ - 4 ACSR			10.515	√	√			√	$7,637	$15,209
2015	Hardwicks Creek Ckt 2	634	4 ACSR to 336 ACSR	5.667				√			√	$80,313	$86,200
2018	Hardwicks Creek Ckt 2	641	4 ACSR to 1/0 ACSR	3.730				√			√	$68,947	$48,707
		6411	4 ACSR to 1/0 ACSR	1.514				√			√	$68,947	$19,770
2021	Clay City Ckt 4	5253	6 ACWC to 336 ACSR	5.158				√			√	$80,313	$78,457
		580	336 ACSR to 795 ACSR		2.760				√		√	$99,716	$52,124
		576	4/0 ACSR to 336 ACSR		4.382				√		√	$80,313	$66,654
2023	Clay City Ckt 4	5801	336 ACSR to 795 ACSR		2.588				√		√	$99,716	$48,876
		6783	4 ACSR to 2Φ - 2 ACSR	1.562				√			√	$32,566	$9,634
Total				32.612	9.730	78.620							$765,768

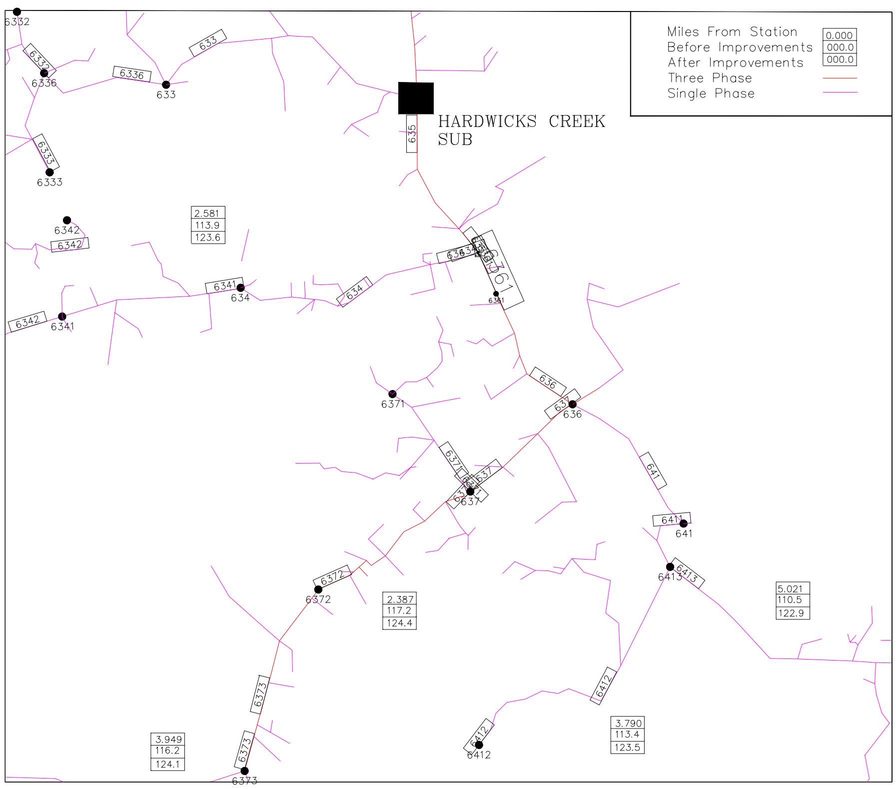
1. The "Scope" portion of the table summarizes the proposed conductor (if any) and the miles of conversion, reconductoring and/or 25 kV voltage conversion required for each project.
2. The "Rationale" portion of the table summarizes as a check mark (√) where the existing system fails to satisfy one or more design criteria and conditions the project will correct or improve. A "Voltage" √-mark means the existing system fails to satisfy the 8- and 16-Volt drop criteria with no more than one tier of line regulation presented in Section 4.4. A "Balance" √-mark means the existing system fails to satisfy the 56-Amp single-phase loading criteria presented in Section 4.5. A "Capacity" √-mark means the existing system fails to satisfy conductor loading criteria of 80-percent or 50-percent of thermal rating on radial and intertie circuits respectively presented in Section 4.6. A "Reliability" √-mark identifies that a project is needed to improve backfeed capabilities and/or aging conductor is recommended for replacement.
3. The "Design Criteria" portion of the table summarizes as a √-mark that a proposed project satisfies all design criteria presented in Section 4, "Preparation of LRP, CWP and Substation Evaluation Design".

Year	Location	Scope of Substation & Transmission Improvements	Dist (kft)	Unit Cost	Subtotal
2004	Hardwicks Creek Substation	Construct new 69 kV three-way tap structure and switch for new substation subtransmission tap.		$37,769	$37,769
		Construct new 69 kV subtransmission tap to serve new substation.	16.610	$192,410	$605,291
		Construct new 69/12.5 kV, 5.6 MVA substation.		$395,522	$395,522
		Construct new 12.5/24.9 kV, 5.0 MVA autotransformer bank in new substation for Hardwicks Creek Ckt 2		$62,948	$62,948
2010	Clay City Substation	Replace existing power transformer with 15/20/25 MVA rated unit for extreme summer peak.		$370,343	$370,343
Total					$1,471,873



Hardwicks Creek Substation Site - Clay City USGS Quad Map





Hardwicks Creek Distribution and Voltage Drop Area Map

6.3 Miller Hunt Substation - Distribution System Alternatives

An overview of the existing system in the Miller Hunt Substation area is presented prior to presenting alternatives with and without the proposed substation on the next page. A schedule on pages 32-33 summarizes all proposed system improvements with and without the proposed substation. A USGS quad map section and facility map on pages 34-35 illustrates the geographical and distribution system location of the proposed substation. Economic evaluation results are presented in Section 6.5. Printouts of the load flow analysis are available as a separate document.

<u>Overview of Existing System</u>

A long feeder from Hunt Substation serves all the Muddy Creek, Two-Mile, KY 89 and KY 15 areas of Clark County. Members residing throughout these areas of Clark County near Winchester center on the unincorporated communities of Ruckerville, Schollsville and Pilot View. The area is attracting more development since Clark County is part of the Lexington, KY metropolitan area. Continued residential growth is anticipated because the new Winchester bypass and a new Mountain Parkway exit offering convenient access to Interstate 64 is proposed for this area. Similarly, another long 12.5 kV feeder from Reid Village Substation serves all the US 60 area between Winchester and Mt. Sterling in Montgomery County. Members residing in these areas center on the unincorporated communities of Reid Village, Sewell Shop and Winetown.

Member growth throughout all these areas led to 25 kV conversion of the Hunt Ckt 1 feeder in the early-1990s and construction of Reid Village Substation in 1999. These upgrades have heretofore deferred other projects to improve capacity and voltage levels otherwise required throughout the area spanning the Clark-Montgomery County line between Winchester and Mt. Sterling. Continued growth based on the 2002 PRS load forecast, however, will require a scheduled program of distribution projects on Reid Village Ckt 1 to serve the US 60-Winetown area beginning in 2004. Reid Village Ckt 1 consists of mostly 4 ACSR conductor for about 3.7-miles from Reid Village Substation along US 60 until three-phase facilities ends at Sewell Shop at the Clark-Montgomery County line. This feeder continues as a two-phase line comprised mostly of 4 ACSR for about 4.6-miles until it terminates at a common open point with Hunt Ckt 1. Switching load via an autotransformer bank to defer system improvements is not practical because of very long feeder distances from Hunt Substation and limited capacity on Reid Village Ckt 1. A 25 kV conversion of the Reid Village feeder is not practical because of implications affecting other nearby feeders.

Two alternative cases were developed within the substation evaluation to study competing plans without and with the proposed Miller Hunt Substation, i.e. Case 3 and Case 4 respectively. Only two alternatives are needed to develop a thorough substation evaluation since a 25 kV conversion of Reid Village Ckt 1 is not practical. Both alternatives presented within the evaluation are developed to offer adequate capacity and voltage levels at design loads over the study period with reasonable reliability. Case 3 and 4 highlights are presented on the next page.

Case 3 - Upgrade Existing Facilities at 12.5 kV and 25 kV

Case 3 is the baseline plan of upgrading the existing distribution system without constructing Miller Hunt Substation. Design loads from the 2002 PRS ten-percent case anticipated for Reid Village Ckt 1 and Hunt Ckt 1 serving the Clark-Montgomery County areas previously discussed are summarized in the table below. A series of reconductoring and conversion projects totaling 13.1-miles is scheduled over the study period to provide adequate service that meets all operating, reliability, and design load criteria. Much of this work is needed early in the study period. This schedule of system improvements is adequate to satisfy all design criteria for normal and single contingency configurations in the Clark-Montgomery County area. No substation upgrades are forecast until midway through the evaluation period when the power transformer at Hunt Substation must be replaced by 2012. Similarly, no power transformer upgrade is anticipated at Reid Village Substation until 2021. A schedule of all distribution and substation improvements for this alternative is provided in Table 20 on page 32.

Description	Winter Design Loads		Summer Design Loads	
	2003-2004	2022-2023	2004	2023
Hunt Ckt 1	6.55 MW	9.57 MW	4.21 MW	6.14 MW
Reid Village Ckt 1	2.74 MW	3.68 MW	2.21 MW	3.16 MW
Hunt Substation	15.44 MW	22.20 MW	9.51 MW	13.70 MW
Reid Village Substation	4.28 MW	6.65 MW	4.29 MW	6.68 MW

Case 4 - Construct Miller Hunt Substation

Case 4 is the alternative plan of constructing Miller Hunt Substation to defer most distribution and substation improvements otherwise needed to satisfy all the design criteria over the study period. The new substation is proposed to be a generic 11.2 MVA, 69/24.9 kV facility served by a transmission tap about 0.60-miles in length from EKP's Hunt-Sideview 69 kV line. The new substation is located at or near the projected load center at the KY 15 - Miller Hunt intersection. A new delivery point at this site allows two long feeders to be divided into five short feeders to defer most system improvements. Only 8.9-miles of feeder improvements are needed and much of it is deferred past the midway point of the study period. Similarly, Hunt Substation upgrades are deferred past the study period. Design loads from the 2002 PRS ten-percent case forecast for this alternative are summarized in the table below. A schedule of all forecast distribution and substation improvements is provided in Table 21 on page 33.

Description	Winter Design Loads		Summer Design Loads	
	2003-2004	2022-2023	2004	2023
Hunt Ckt 1	2.05 MW	2.98 MW	1.160 MW	1.68 MW
Reid Village Ckt 1	1.58 MW	2.058 MW	1.346 MW	1.79 MW
Hunt Substation	11.11 MW	15.65 MW	6.43 MW	9.04 MW
Reid Village Substation	3.13 MW	4.89 MW	3.47 MW	5.44 MW
Miller Hunt Substation	5.48 MW	8.32 MW	3.90 MW	5.91 MW

Table No. 20
Case 3 - System Improvements Without Miller Hunt Substation (2004 Dollars)

Year	Circuit	LS	Scope (kft)				Rationale (One or More)				Design Criteria	Unit Cost	Subtotal
			Conductor	Conversion	Reconductor	25 kV	Voltage	Balance	Capacity	Reliability			
2004	Reid Village Ckt 1	227	4 ACSR to 336 ACSR		2.623		√		√		√	$80,313	$39,898
		2272	4 ACSR to 336 ACSR		3.795		√		√		√	$80,313	$57,725
		2273	4 ACSR to 336 ACSR		2.352		√		√		√	$80,313	$35,776
		226	4 ACSR to 336 ACSR		2.435		√		√		√	$80,313	$37,038
		2261	2 ACSR to 336 ACSR	1.565					√		√	$80,313	$23,805
		225	2 ACSR to 336 ACSR	0.805			√		√		√	$80,313	$12,245
		2252	4 ACSR to 336 ACSR	3.878			√		√		√	$80,313	$58,987
		2253	4 ACSR to 336 ACSR	3.693					√		√	$80,313	$56,173
2004	Hunt Ckt 1	2712	4 ACSR to 336 ACSR	1.113				√			√	$80,313	$16,930
		2711	4 ACSR to 336 ACSR	2.778				√			√	$80,313	$42,256
		2711TL	336 ACSR to 336 ACSR	0.809				√			√	$80,313	$12,306
		2721	4 ACSR to 336 ACSR	2.312				√			√	$80,313	$35,167
		2721TL	336 ACSR to 336 ACSR	1.236				√			√	$80,313	$18,801
		3032	4 ACSR to 336 ACSR	2.726				√			√	$80,313	$41,465
2010	Hunt Ckt 1	62	4 ACSR to 336 ACSR	6.470				√			√	$80,313	$98,414
		6202	4 ACSR to 336 ACSR	1.862				√			√	$80,313	$28,323
2016	Reid Village Ckt 1	222	4 ACSR to 336 ACSR	2.956					√		√	$80,313	$44,963
2017	Reid Village Ckt 1	2221	4 ACSR to 2 ACSR	7.428				√			√	$32,566	$45,814
		224	4 ACSR to 336 ACSR	5.031				√			√	$80,313	$76,526
2018	Hunt Ckt 1	2532	4 ACSR to 336 ACSR	1.829				√			√	$80,313	$27,821
2022	Reid Village Ckt 1	2222	4 ACSR to 336 ACSR	3.045				√			√	$80,313	$46,317
		2211	4 ACSR to 336 ACSR	4.191			√	√			√	$80,313	$63,748
		221	4 ACSR to 336 ACSR	4.338			√	√			√	$80,313	$65,984
Total				58.065	11.205								$986,480

1. The "Scope" portion of the table summarizes the proposed conductor (if any) and the miles of conversion, reconductoring and/or 25 kV voltage conversion required for each project.
2. The "Rationale" portion of the table summarizes as a check mark (√) where the existing system fails to satisfy one or more design criteria and conditions the project will correct or improve. A "Voltage" √-mark means the existing system fails to satisfy the 8- and 16-Volt drop criteria with no more than one tier of line regulation presented in Section 4.4. A "Balance" √-mark means the existing system fails to satisfy the 56-Amp single-phase loading criteria presented in Section 4.5. A "Capacity" √-mark means the existing system fails to satisfy conductor loading criteria of 80-percent or 50-percent of thermal rating on radial and intertie circuits respectively presented in Section 4.6. A "Reliability" √-mark identifies that a project is needed to improve backfeed capabilities and/or aging conductor is recommended for replacement.
3. The "Design Criteria" portion of the table summarizes as a √-mark that a proposed project satisfies all design criteria presented in Section 4, "Preparation of LRP, CWP and Substation Evaluation Design".

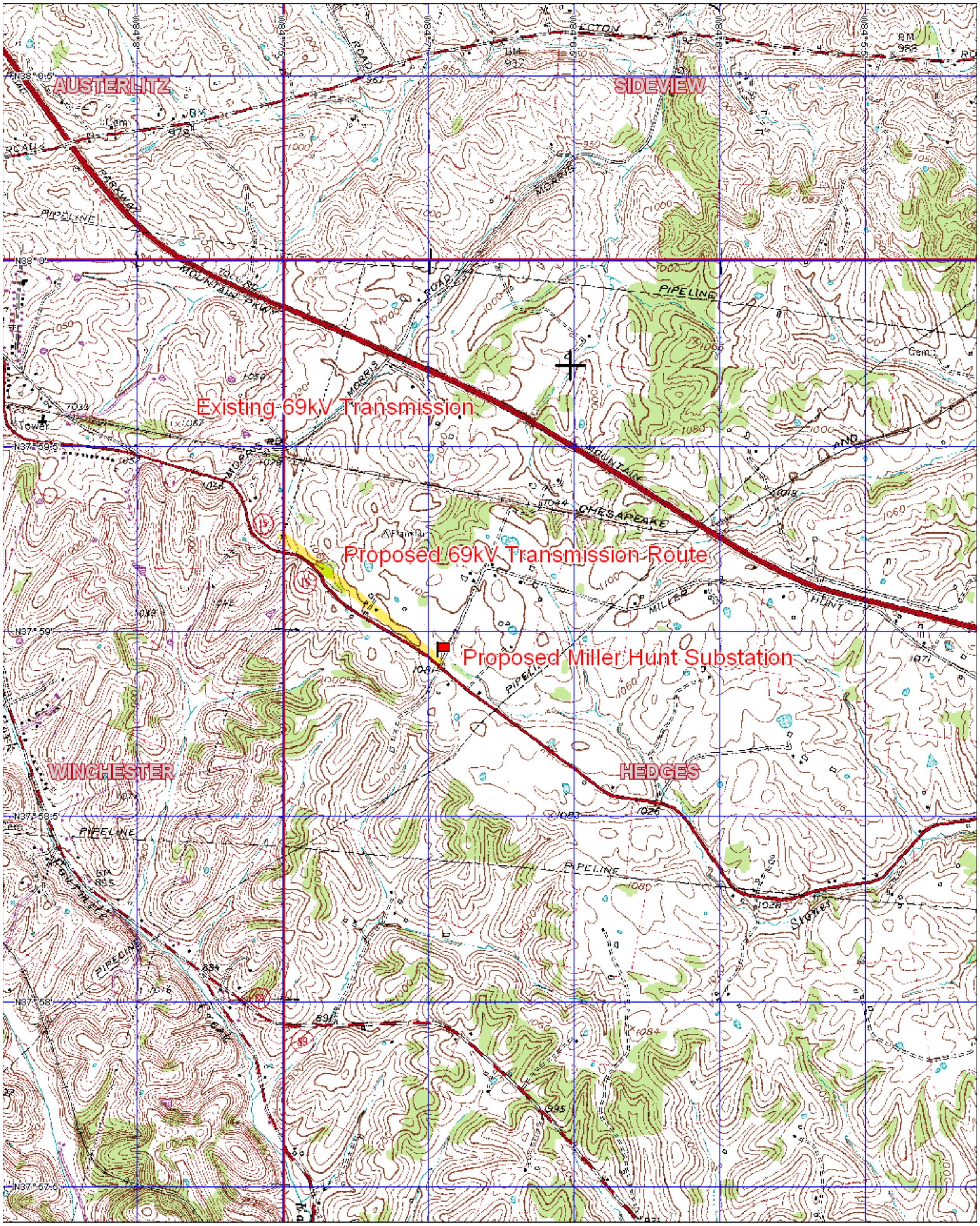
Year	Location	Scope of Substation & Transmission Improvements	Dist (kft)	Unit Cost	Subtotal
2012	Hunt Substation	Replace existing power transformer with 15/20/25 MVA rated unit for extreme winter peak.		$370,343	$370,343
2021	Reid Village Substation	Replace existing power transformer bank with 11.2 MVA rated unit for extreme summer peak.		$152,124	$152,124
Total					$522,467

Table No. 21
Case 4 - System Improvements With Miller Hunt Substation (2004 Dollars)

Year	Circuit	LS	Scope (kft)				Rationale (One or More)				Design Criteria	Unit Cost	Subtotal
			Conductor	Conversion	Reconductor	25 kV	Voltage	Balance	Capacity	Reliability			
2004	Miller Hunt Ckt 2	2712	4 ACSR to 336 ACSR	1.113				√			√	$80,313	$16,930
		2711	4 ACSR to 336 ACSR	2.778				√			√	$80,313	$42,256
		2711TL	336 ACSR to 336 ACSR	0.809				√			√	$80,313	$12,306
		2721	4 ACSR to 336 ACSR	2.312				√			√	$80,313	$35,167
		2721TL	336 ACSR to 336 ACSR	1.236				√			√	$80,313	$18,801
		3032	4 ACSR to 336 ACSR	2.726				√			√	$80,313	$41,465
2011	Hunt Ckt 1	62	4 ACSR to 336 ACSR	6.470				√			√	$80,313	$98,414
		6202	4 ACSR to 336 ACSR	1.862				√			√	$80,313	$28,323
2013	Reid Village Ckt 1	227	4 ACSR to 336 ACSR		2.623				√		√	$80,313	$39,898
2017	Reid Village Ckt 1	224	4 ACSR to 336 ACSR	5.031				√			√	$80,313	$76,526
2019	Miller Hunt Ckt 1	2221	4 ACSR to 2 ACSR	7.428				√			√	$32,566	$45,814
2021	Miller Hunt Ckt 1	2532	4 ACSR to 336 ACSR	1.829				√			√	$80,313	$27,821
		2301	3Φ - 4 ACSR			4.481			√		√	$12,767	$10,835
2023	Reid Village Ckt 1	2272	4 ACSR to 336 ACSR		3.795				√		√	$80,313	$57,725
2023	Miller Hunt Ckt 1	237	4 ACSR to 336 ACSR		2.324				√		√	$80,313	$35,350
Total				33.594	8.742	4.481							$587,628

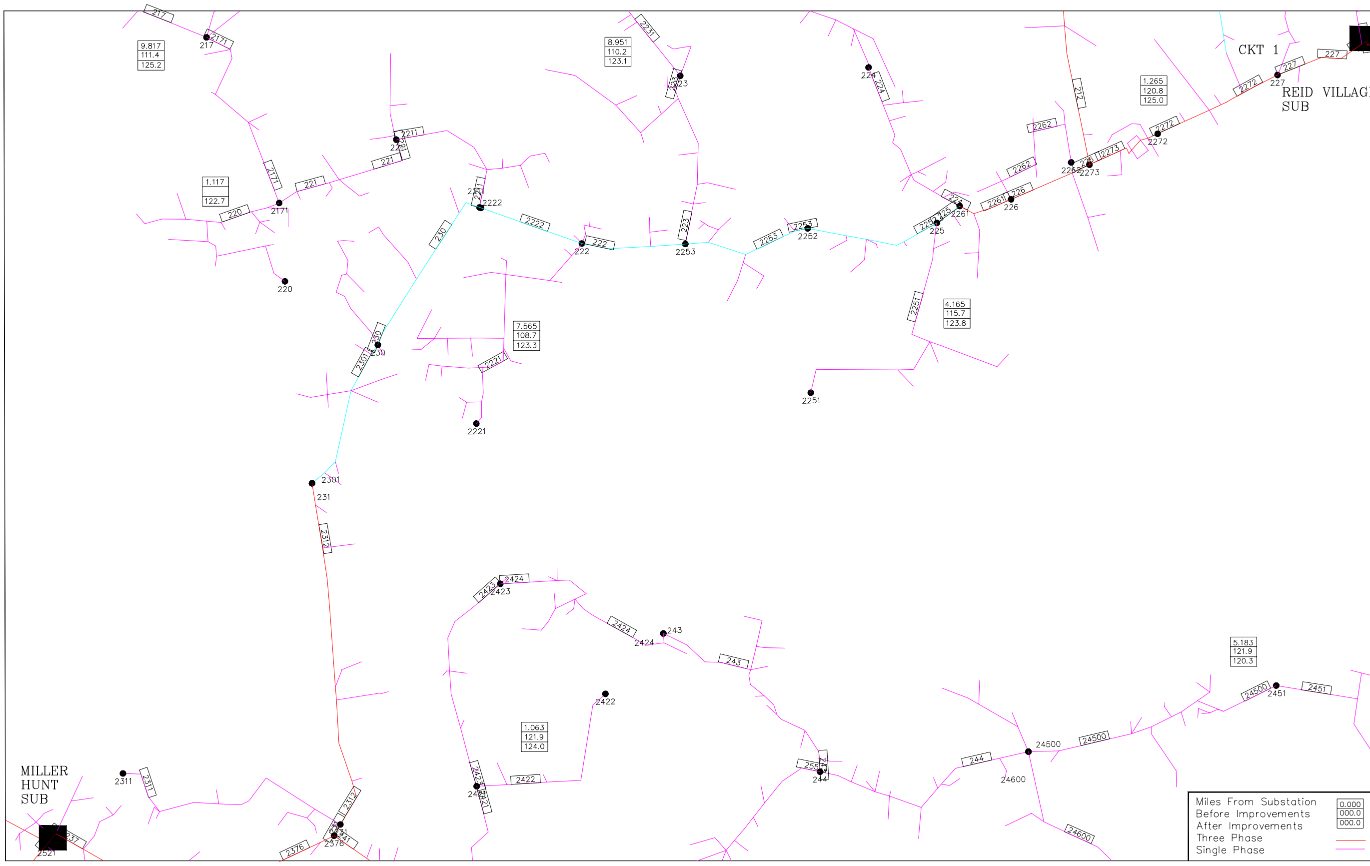
1. The "Scope" portion of the table summarizes the proposed conductor (if any) and the miles of conversion, reconductoring and/or 25 kV voltage conversion required for each project.
2. The "Rationale" portion of the table summarizes as a check mark (√) where the existing system fails to satisfy one or more design criteria and conditions the project will correct or improve. A "Voltage" √-mark means the existing system fails to satisfy the 8- and 16-Volt drop criteria with no more than one tier of line regulation presented in Section 4.4. A "Balance" √-mark means the existing system fails to satisfy the 56-Amp single-phase loading criteria presented in Section 4.5. A "Capacity" √-mark means the existing system fails to satisfy conductor loading criteria of 80-percent or 50-percent of thermal rating on radial and intertie circuits respectively presented in Section 4.6. A "Reliability" √-mark identifies that a project is needed to improve backfeed capabilities and/or aging conductor is recommended for replacement.
3. The "Design Criteria" portion of the table summarizes as a √-mark that a proposed project satisfies all design criteria presented in Section 4, "Preparation of LRP, CWP and Substation Evaluation Design".

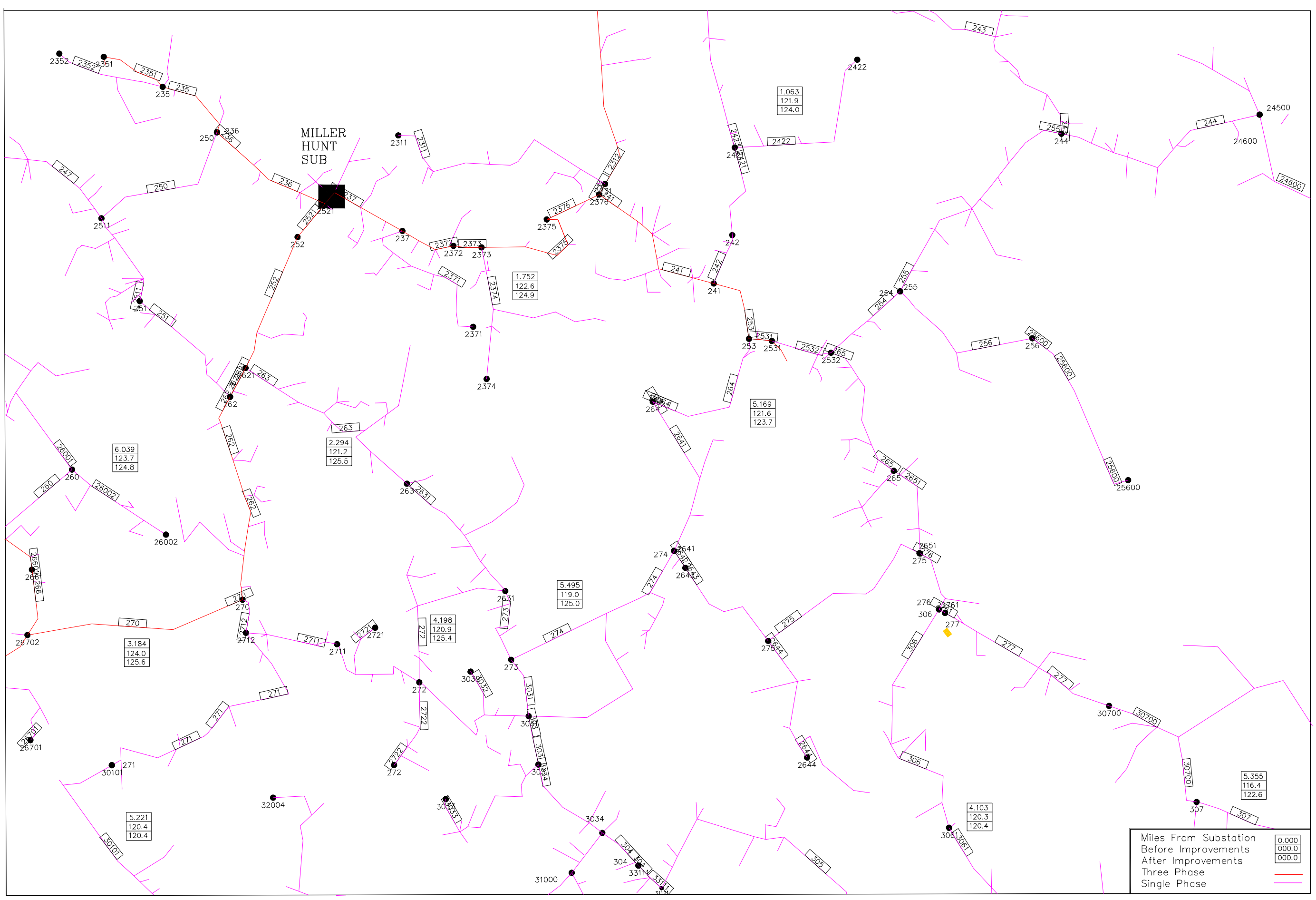
Year	Location	Scope of Substation & Transmission Improvements	Dist (kft)	Unit Cost	Subtotal
2004	Miller Hunt Substation	Construct new 69 kV three-way tap structure and switch for new substation subtransmission tap.		$37,769	$37,769
		Construct new 69 kV subtransmission tap to serve new substation.	3.685	$192,410	$134,286
		Construct new 69/24.9 kV, 11.2 MVA substation.		$542,400	$542,400
Total					$714,455



750 ft Scale: 1 : 25,000 Detail: 13-0 Datum: WGS84

Miller Hunt Substation Site - Hedges USGS Quad Map





Miller Hunt Distribution and Voltage Drop Area Map

6.4 Reliability Assessment of Alternative Plans

A reliability assessment is prepared by modeling the distribution sectionalizing scheme to estimate outage indices for competing plans with and without proposed substations. Existing feeders modeled within the evaluation are assumed to be typical of the distribution system with SAIFI and CAIDI values equal to the present three-year mean without major storms. These two metrics along with SAIDI are the most frequently used indices summarizing distribution reliability. Definitions of these measures are provided in Table No. 22 below. We begin the reliability assessment by assuming existing feeders without any new substations are representative of the entire distribution system. SAIFI is a measure of outage frequency and a function of failure rates for major distribution components. Similarly, CAIDI is a measure of outage duration and a function of response, repair and service restoration time after an outage occurs. Feeders in competing plans without new substations are assumed to have SAIFI and CAIDI values equal to the overall three-year system average provided in the table below. Failure rates on key feeder components are estimated until feeder SAIFI equals the total system. Similarly, time to find the cause of an outage is estimated until feeder CAIDI equals the total system after times to repair, switch, bypass and traverse a feeder are estimated. Failure rates are assumed constant in the study while the time to find problems is assumed proportional to average feeder length before and after a new substation. A reliability assessment comparing outage indices of competing plans with a new substation relative to the existing system is developed using this method and summarized below.

Table No. 22
Comparison of Reliability Indices

Outage Indice	Existing System	Hardwicks Creek Substation	Miller Hunt Substation	Olympia Springs Substation
SAIFI	1.568	1.1781	1.1474	1.2912
CAIDI	1.250	0.5567	0.7857	0.8572
SAIDI	1.960	0.6559	0.9016	1.1068

SAIFI - system average interruption frequency index, i.e. annual outages per customer.
SAIDI - system average interruption duration index, i.e. annual hrs of outage per customer.
CAIDI - customer average interruption duration index, i.e. average customer outage duration.

The alternative plans of constructing the proposed substations are more reliable than the baseline cases of upgrading the existing distribution system. All the competing plans were developed using the same design criteria earlier presented to ensure reliability assessments are uniform among the cases. Reliability improvements will vary among proposed substation areas depending on the number of feeders, feeder topology, single-contingency availability and overall exposure. An estimate for SAIDI allows reliability to be economically evaluated from the members' perspective. An internal 2000 study sponsored by EKP concludes that members surveyed report that avoiding a one hour outage has an average annual value of $4.77 from the members' perspective. These survey and reliability study results are included in the economic evaluation of alternative plans presented within the next section.

6.5 Economic Evaluation of Alternative Plans

The substation evaluation estimates total one-system costs incurred by Clark and EKP for a variety of alternative plans. Alternative plans developed within the evaluation satisfy a common set of design load, operating and reliability criteria over the study period and are consistent with the 2002 PRS load forecast. Evaluation design criteria were established in Section 4 and summarized in Section 6.1. Three areas of consideration were included in studies of alternative plans with and without proposed substations to economically evaluate total one-system costs. One, cash flows of annual fixed costs associated with investment in distribution, substation and transmission facilities are included within the competing plans. Two, each plan evaluates distribution losses using one-system avoided costs for all feeders switched into their normal operating configuration. Finally, a reliability assessment of the competing plans allows the members' value of reliability using SAIDI estimates be included within the economic evaluation of new substations. All costs associated with these three areas of consideration are evaluated on an annual and cumulative present value basis over a common twenty-year period. The same economic criteria earlier presented and a common discount rate is used to evaluate all plans on a one-system basis. A summary of economic evaluation results for the alternative plans is provided in Table No. 23 below. A graphical summary of the economic evaluation for each alternative plan is provided on page 38. All evaluation details are provided within the Appendix.

Table No. 23
Summary of Substation Evaluation

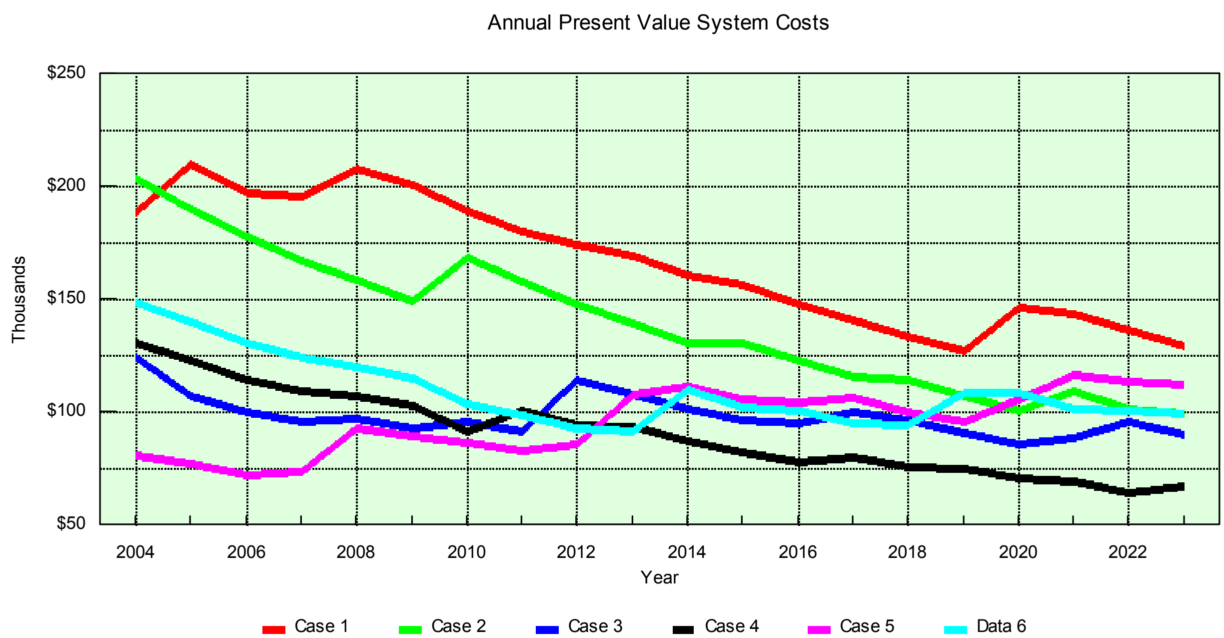
Description	Hardwicks Creek Plans		Miller Hunt Plans		Olympia Springs Plans	
	No Sub	New Sub	No Sub	New Sub	No Sub	New Sub
Clark Facility Cost	$2,025,026	$787,410	$1,170,906	$544,330	$1,181,480	$379,055
EKP Facility Cost	$487,172	$1,730,828	$254,526	$895,928	$231,684	$1,477,547
Facility Subtotal	$2,512,198	$2,518,238	$1,425,432	$1,440,258	$1,413,164	$1,856,602
Loss Costs	$464,720	$155,926	$331,173	$284,804	$349,119	$241,440
Member Reliability	$355,807	$119,813	$212,614	$97,629	$160,862	$91,100
One-System Cost	$3,332,725	$2,793,977	$1,969,219	$1,822,691	$1,923,145	$2,189,142

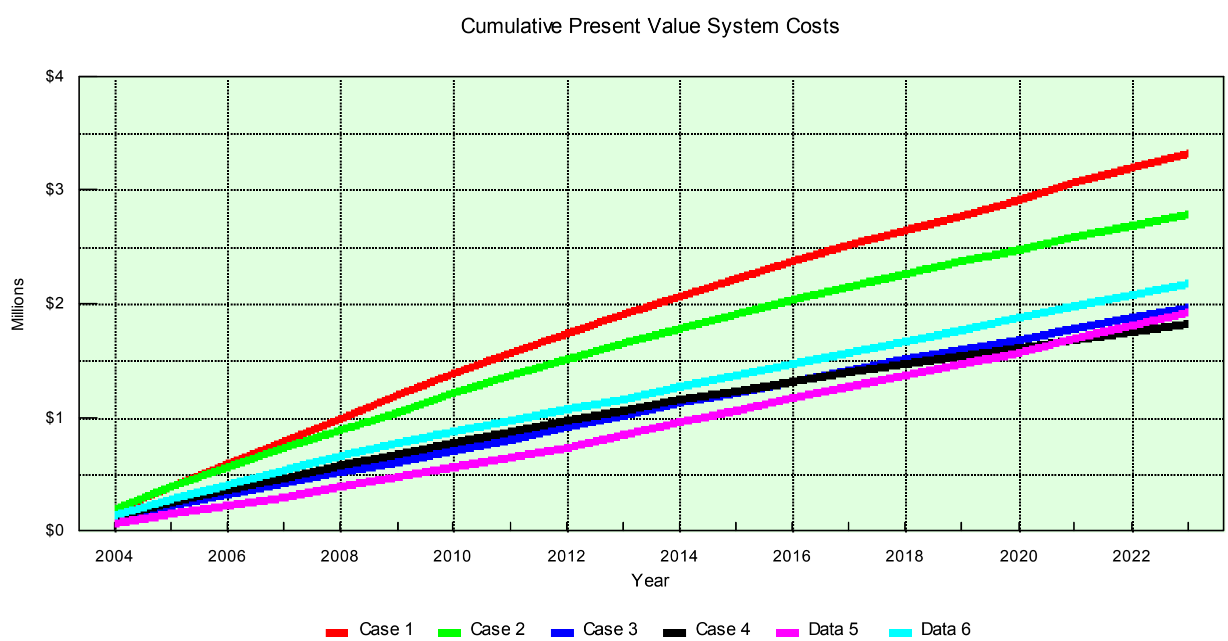
Note: All costs are cumulative or total present value costs over the twenty-year evaluation period.

Cases developed for the proposed Hardwicks Creek and Miller Hunt Substations represent the least cost alternative compared to their respective baseline cases of upgrading the existing distribution system. Both substations are economically attractive considering present value cash flows of facility costs alone. Including the present value of distribution losses at avoided costs and reliability costs from the members' perspective strengthens the economic attractiveness of these substations as the least cost plan. Olympia Springs Substation, however, was evaluated to be more costly on a present value basis over the twenty-year study period than upgrading the existing distribution system. Present value facility costs for Olympia Springs Substation are much higher than the baseline case. Distribution losses and member reliability cost savings are insufficient to compensate higher facility costs associated with the proposed substation.

2004-2023 Cumulative Present Value Evaluation Summary					
Case Description	**Distribution PV Facility Cost**	**G&T PV Facility Cost**	**Reliability Value PV Cost**	**Distribution PV Loss Cost**	**Total PV Cost**
Case 1 - Plan w/o Hardwicks Ck Sub	$2,025,026	$487,172	$355,807	$464,720	$3,332,725
Case 2 - Plan w/ Hardwicks Ck Sub	$787,410	$1,730,828	$119,813	$155,926	$2,793,977
Case 3 - Plan w/o Miller Hunt Sub	$1,170,906	$254,526	$212,614	$331,173	$1,969,219
Case 4 - Plan w/ Miller Hunt Sub	$544,330	$895,928	$97,629	$284,804	$1,822,691
Case 5 - Plan w/o Olympia Springs Sub	$1,181,480	$231,684	$160,862	$349,119	$1,923,145
Case 6 - Plan w/ Olympia Springs Sub	$379,055	$1,477,547	$91,100	$241,440	$2,189,142

Notes: Loss costs only reflect distribution feeder losses valued at avoided costs.
All evaluation categories reflect total present value costs in 2004 dollars.





6.6 Substation Evaluation Conclusions

Clark recommends EKP construct the proposed Hardwicks Creek and Miller Hunt Substations in 2004 in lieu of the alternatives of building a series of distribution and substation system improvements. The evaluation confirms that Hardwicks Creek and Miller Hunt Substations are the least cost and most reliable alternatives. The 2002 PRS load forecast will require a series of system improvements over the evaluation period to provide distribution service consistent with all design criteria. Both substations defer distribution and substation improvements and represent the best plan over the study period. Key points about the Hardwicks Creek and Miller Hunt substation evaluations are summarized as follows:

<u>Hardwicks Creek Substation</u>

1. The Hardwicks Creek Substation plan has lower total one-system costs than the baseline plan of upgrading the existing distribution system, i.e. $2,793,977 versus $3,332,725. So, present value savings of building the substation is about $539,000 over the study period. Savings are attributed to deferring improvements otherwise needed, reducing losses and improving members' reliability.
2. The Hardwicks Creek Substation plan greatly improves members' reliability in the affected areas. SAIFI and CAIDI are estimated to be reduced about 25- and 55-percent respectively relative to the existing system. SAIDI, the overall metric on members' total outage duration, is estimated to fall about 67-percent relative to the existing system.
3. The Hardwicks Creek Substation is proposed to be a generic 5.6 MVA, 69/12.5 kV facility served by a transmission tap about 3.5-miles in length from EKP's Clay City-Stanton 69 kV line. Siting is at the KY 1057-Frames Branch Road intersection south of Clay City in Powell County.

<u>Miller Hunt Substation</u>

1. The Miller Hunt Substation plan has lower total one-system costs than the baseline plan of upgrading the existing distribution system, i.e. $1,822,691 versus $1,969,219. So, present value savings of building the substation is about $146,500 over the study period. Savings are attributed to deferring improvements otherwise needed, reducing losses and improving members' reliability.
2. The Miller Hunt Substation plan greatly improves members' reliability in the affected areas. SAIFI and CAIDI are estimated to be reduced about 27- and 37-percent respectively relative to the existing system. SAIDI, the overall metric on members' total outage duration, is estimated to fall about 54-percent relative to the existing system.
3. The Miller Hunt Substation is proposed to be a generic 11.2 MVA, 69/24.9 kV facility served by a transmission tap about 0.60-miles in length from EKP's Hunt-Sideview 69 kV line. Siting is at the KY 15-Miller Hunt Road intersection east of Winchester in Clark County.

<u>Olympia Springs Substation</u>

1. Olympia Springs Substation is not economical now, but should be re-evaluated for the next LRP.

7 Proposed 2003-2005 CWP Program

The LRP anticipates distribution system improvements and other routine plant changes over a five-year planning horizon consistent with all design criteria to ensure orderly expansion of the electric system. Similarly, the CWP is an action plan to begin implementing LRP recommendations and anticipates system improvements to serve a short-term design load. Other short-term needs and equipment are included in the CWP to improve power factor, regulation and sectionalization. A majority of CWP costs is for routine activities such as new service construction, service upgrades, pole and primary conductor replacements, meters, transformers and security lights. An overview of all proposed 2003-2005 CWP and 2008 LRP activities, projects and programs is provided within Table No. 24 below. A detailed presentation of these costs is provided in a format similar to the RUS Form 740C on pages 42-45.

Table No. 24
Summary of 2003-2005 CWP and 2008 LRP

Description or Category	2003-2005 CWP - $17,477,087		2008 LRP - $33,589,075	
	Quantity/Miles	Cost	Quantity/Miles	Cost
New Services	2601	$5,873,988	5202	$12,293,088
Service Upgrades	354	$329,220	708	$688,884
New Security Lights	1518	$340,032	3036	$710,424
Pole Replacements	1086	$1,034,958	2172	$2,165,484
New Meters	1900	$233,700	6800	$877,200
New Transformers	3714	$2,971,200	7428	$6,217,236
System Improvements	85.24-miles	$3,964,989	115.63-miles	$6,545,426
Equipment & Sectionalizing		$1,529,000		$2,891,333
Office Renovation & Expansion		$1,200,000		$1,200,000

7.1 System Improvement Projects

Proposed system improvement projects are identified with engineering analysis software to review the adequacy of the distribution system at design loads using a variety of design criteria. Operational considerations also contribute to identifying needs. Maintaining a proper voltage level is generally the limiting criteria when evaluating regulation needs or building system improvements. Similarly, projects are evaluated using other design criteria involving capacity, imbalance, sectionalization and reliability considerations. All LRP, CWP and substation evaluation design criteria were earlier presented within Section 4. The recommended CWP program of short-term system improvements includes a variety of conversion, reconductoring and 24.9 kV conversion projects. A descriptive summary of these projects is provided in Table No. 25 on the next page. Alternatives did not exist to switch loads, were too costly or impractical (e.g. 25 kV conversion) for all proposed CWP projects. Proposed projects are illustrated by code with before and after voltage levels on system maps accompanying this document. A list by code and line section for all projects is provided in a format similar to the Form 740C on pages 42-45.

Table No. 25
Summary of 2003-2005 Construction Work Plan System Improvement Projects

Code	Cost	Year	Project	County	Circuit	Scope (miles)				Rationale (One or More)				Design Criteria	Comments
						Conductor	Conversion	Reconductor	25 kV	Voltage	Balance	Capacity	Reliability		
301	$40,708	2005	Mud Lick	Bath	Blevins Valley 2	2 ACSR	1.25			√	√			√	2-Phase. No alternatives.
302	$250,577	2003	Big Stoner	Clark	Sideview 4	336 ACSR	3.12			√	√	√		√	
303	$25,355	2004	Kiddville-Schollsville		Miller Hunt 1				3.32	√	√			√	Switch Mt. Sterling 3 loads.
304	$217,648		Trapp-Goff Corner		Trapp 1	336 ACSR	2.71			√			√	√	Backfeed Mt. Sterling 3 loads.
305	$167,052	2005	Dry Fork-Ruckerville		Miller Hunt 2	336 ACSR	2.08				√			√	New substation feeder.
306	$224,073		Clintonville-Thatcher		Van Meter 3	336 ACSR		2.79				√	√	√	Maintain backfeed capability.
307	$91,557		Winetown-US60		Miller Hunt 1	336 ACSR	1.14						√	√	Miller Hunt-Reid Vg backfeed.
308	$126,894		Sewell Shop-US60		Reid Village 1	336 ACSR	1.58						√	√	Miller Hunt-Reid Vg backfeed.
309	$130,107	2004	Dan Rg-KY1053(1)	Menifee	Frenchburg 4	336 ACSR	1.62			√	√			√	
310	$57,022	2005	Indian Ck-US460(1)		Frenchburg 3	336 ACSR		0.71				√	√	√	Maintain backfeed capability.
311	$297,961	2003	Levee-KY11	Montgomery	Mt. Sterling 2	336 ACSR	3.71				√			√	Switch Sawmill loads.
312	$67,568		O'Rear		Mt. Sterling 2	1/0 ACSR	0.98				√			√	Switch Nest Egg loads.
313	$198,383		Aarons-Bunker		Sideview 2				18.50				√	√	Backfeed industrial park.
314	$137,335	2004	Howell-Drennon		Sideview 3	336 ACSR	1.71				√		√	√	Backfeed Mt. Sterling airport.
315	$129,304		Grassy Lick (1)		Sideview 3	336 ACSR		1.61				√	√	√	Maintain backfeed capability.
316	$66,612	2005	McCormick Road(1)		Hope 3	2 ACSR	1.04				√			√	
317	$21,231		Spencer-KY782		Hope 3				2.78	√	√			√	
318	$47,385		Prewitt Pike-US60		Reid Village 2	336 ACSR		0.59				√	√	√	Maintain backfeed capability.
319	$133,320	2003	Cat Creek	Powell	Stanton 2	336 ACSR	1.66			√	√			√	Switch to reduce Bowen load.
320	$270,655		Furnace-KY213		Stanton 3	336 ACSR	3.37			√	√			√	
321	$87,541		Ewing Trail		Stanton 4	336 ACSR	1.09			√	√			√	
322	$55,416		Morris Creek(1)		Stanton 4	336 ACSR		0.69		√				√	
323	$100,391	2004	Virden-Lone Oak		Clay City 1	336 ACSR	1.25				√		√	√	Backfeed some Snow Ck load.
324	$132,516		Adams Br-KY82(1)		Clay City 2	336 ACSR	1.65			√	√			√	Build Hardwicks Ck intertie.
325	$73,888		Adams Br-KY82(2)		Clay City 2	336 ACSR		0.92					√	√	Build Hardwicks Ck intertie.
326	$130,107		Clay City-KY11(1)		Clay City 4	336 ACSR	1.62				√			√	
327	$127,411		Hardwicks Ck		Hardwicks Ck 2				14.89	√	√			√	New substation feeder.
328	$97,982		Frames Branch		Hardwicks Ck 3	336 ACSR	1.22				√		√	√	Build Hardwicks Ck intertie.
329	$67,463		Frames Br-KY82		Hardwicks Ck 3	336 ACSR	0.84						√	√	Build Hardwicks Ck intertie.
330	$147,579	2005	Clay City-KY15		Clay City 2	795 ACSR		1.48				√	√	√	Maintain backfeed capability.
331	$25,401		Brush Creek		Clay City 1	2 ACSR	0.78				√			√	2-Phase.
332	$143,760		Bowen-Cat Creek		Bowen 3	336 ACSR	1.79						√	√	Maintain backfeed capability.
333	$74,787		Morris Creek(2)		Stanton 4	795 ACSR		0.75				√	√	√	Maintain backfeed capability.
Total	$3,964,989						36.21	9.54	39.49						

1. The "Scope" portion of the table summarizes the proposed conductor (if any) and the miles of conversion, reconductoring and/or 25 kV voltage conversion required for each project. Brief notes are included within the "Comments" column. See the 740C Form within the Appendix for a detailed listing of circuit configuration changes and costs by line section number for each project.
2. The "Rationale" portion of the table summarizes as a check mark (√) where the existing system fails to satisfy one or more design criteria and conditions the project will correct or improve. A "Voltage" √-mark means the existing system fails to satisfy the 8- and 16-Volt drop criteria with no more than one tier of line regulation presented in Section 4.4. A "Balance" √-mark means the existing system fails to satisfy the 56-Amp single-phase loading criteria presented in Section 4.5. A "Capacity" √-mark means the existing system fails to satisfy conductor loading criteria of 80-percent or 50-percent of thermal rating on radial and intertie circuits respectively presented in Section 4.6. A "Reliability" √-mark identifies that a project is needed to improve backfeed capabilities and/or aging conductor is recommended for replacement.
3. The "Design Criteria" portion of the table summarizes as a √-mark that a proposed project satisfies all design criteria presented in Section 4, "Preparation of LRP, CWP and Substation Evaluation Design".

2003-2005 Construction Work Plan
Distribution Cost Estimates - RUS Form 740C

Code	Service Membership						Total Cost
	Description			Miles	Quantity	Cost	
100	Underground Service Membership Construction			33.00	753	$2,004	$1,509,012
	Overhead Service Membership Construction			120.00	1848	$2,362	$4,364,976
	Subtotal						**$5,873,988**
Code	**New Tie-Lines**						**Total Cost**
	Description	County	Circuit	LS	Miles	Cost/Mi	
	Subtotal - Code 200's						
Code	**Conversion and Line Changes**						**Total Cost**
	Description	County	Circuit	LS	Miles	Cost/Mi	
301	**Mud Lick Project**						
301.01	Conversion; 1P, 4 ACSR to 2P, 2 ACSR	Bath	Blevins Valley Ckt 2	10224	0.19	$32,566	$6,188
301.02	Conversion; 1P, 4 ACSR to 2P, 2 ACSR	Bath	Blevins Valley Ckt 2	1022	1.06	$32,566	$34,520
	Code Subtotal				**1.25**		**$40,708**
302	**Big Stoner Project**						
302.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Clark	Sideview Ckt 4	175	1.04	$80,313	$83,526
302.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	200	1.51	$80,313	$121,273
302.03	Conversion; 1P, 2 ACSR to 3P, 336 ACSR	Clark	Sideview Ckt 4	2002	0.57	$80,313	$45,778
	Code Subtotal				**3.12**		**$250,577**
303	**Kiddville-Schollsville Project**						
303.01	Voltage conversion; 1P, 4 ACSR	Clark	Miller Hunt Ckt 1	255	1.36	$7,637	$10,386
303.02	Voltage conversion; 1P, 4 ACSR	"	"	256	0.91	$7,637	$6,950
303.03	Voltage conversion; 1P, 4 ACSR	Clark	Miller Hunt Ckt 1	25600	1.05	$7,637	$8,019
	Code Subtotal				**3.32**		**$25,355**
304	**Trapp-Goff Corner Project**						
304.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Clark	Trapp Ckt 1	31400	0.62	$80,313	$49,794
304.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	314	0.47	$80,313	$37,747
304.03	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	3141	0.07	$80,313	$5,622
304.04	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	326	0.63	$80,313	$50,597
304.05	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	3262	0.63	$80,313	$50,597
304.06	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Clark	Trapp Ckt 1	3263	0.29	$80,313	$23,291
	Code Subtotal				**2.71**		**$217,648**
305	**Dry Fork-Ruckerville Project**						
305.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Clark	Miller Hunt Ckt 2	2712	0.21	$80,313	$16,866
305.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	2711	0.53	$80,313	$42,566
305.03	Conversion; 1P, 336 ACSR to 3P, 336 ACSR	"	"	2711	0.15	$80,313	$12,047
305.04	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	2721	0.44	$80,313	$35,338
305.05	Conversion; 1P, 336 ACSR to 3P, 336 ACSR	"	"	2721	0.23	$80,313	$18,472
305.06	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Clark	Miller Hunt Ckt 2	3032	0.52	$80,313	$41,763
	Code Subtotal				**2.08**		**$167,052**
306	**Clintonville-Thatcher Project**						
306.01	Reconductor; 3P, 1/0 ACSR to 3P, 336 ACSR	Clark	Van Meter Ckt 3	25	1.19	$80,313	$95,572
306.02	Reconductor; 3P, 1/0 ACSR to 3P, 336 ACSR	"	"	1325	0.90	$80,313	$72,282
306.03	Reconductor; 3P, 1/0 ACSR to 3P, 336 ACSR	"	"	17	0.48	$80,313	$38,550
306.04	Reconductor; 3P, 1/0 ACSR to 3P, 336 ACSR	Clark	Van Meter Ckt 3	15	0.22	$80,313	$17,669
	Code Subtotal				**2.79**		**$224,073**
307	**Winetown-US 60 Project**						
307.01	Conversion; 2P, 4 ACSR to 3P, 336 ACSR	Clark	Miller Hunt Ckt 1	2222	0.58	$80,313	$46,582
307.02	Conversion; 2P, 4 ACSR to 3P, 336 ACSR	Clark	Miller Hunt Ckt 1	222	0.56	$80,313	$44,975
	Code Subtotal				**1.14**		**$91,557**

308	**Sewell Shop-US 60 Project**						
308.01	Conversion; 2P, 4 ACSR to 3P, 336 ACSR	Clark	Reid Village Ckt 1	225	0.15	$80,313	$12,047
308.02	Conversion; 2P, 4 ACSR to 3P, 336 ACSR	"	"	2252	0.73	$80,313	$58,628
308.03	Conversion; 2P, 4 ACSR to 3P, 336 ACSR	Clark	Reid Village Ckt 1	2253	0.70	$80,313	$56,219
	Code Subtotal				**1.58**		**$126,894**
309	**Dan Ridge-KY 1053 Project - Part 1**						
309.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Menifee	Frenchburg Ckt 4	11354	0.61	$80,313	$48,991
309.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Menifee	Frenchburg Ckt 4	11356	1.01	$80,313	$81,116
	Code Subtotal				**1.62**		**$130,107**
310	**Indian Creek-U.S. 460 Project - Part 1**						
310.01	Reconductor; 3P, 2 ACSR to 3P, 336 ACSR	Menifee	Frenchburg Ckt 3	1071	0.56	$80,313	$44,975
310.02	Reconductor; 3P, 2 ACSR to 3P, 336 ACSR	Menifee	Frenchburg Ckt 3	10711	0.15	$80,313	$12,047
	Code Subtotal				**0.71**		**$57,022**
311	**Levee-KY 11 Project**						
311.01	Conversion; 1P, 336 ACSR to 3P, 336 ACSR	Montgomery	Mt. Sterling Ckt 2	5216	0.12	$80,313	$9,638
311.02	Conversion; 1P, 336 ACSR to 3P, 336 ACSR	"	"	521	0.94	$80,313	$75,494
311.03	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	"	"	5211	0.22	$80,313	$17,669
311.04	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	"	"	5213	0.39	$80,313	$31,322
311.05	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	"	"	5215	0.71	$80,313	$57,022
311.06	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	5433	0.14	$80,313	$11,244
311.07	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Montgomery	Mt. Sterling Ckt 2	5431	1.19	$80,313	$95,572
	Code Subtotal				**3.71**		**$297,961**
312	**O'Rear Project**						
312.01	Conversion; 1P, 6 ACWC to 3P, 1/0 ACSR	Montgomery	Mt. Sterling Ckt 2	5210	0.98	$68,947	$67,568
	Code Subtotal				**0.98**		**$67,568**
313	**Aarons Run - Bunker Hill Project**						
313.01	Voltage conversion; 3P, 4/0 ACSR	Montgomery	Sideview Ckt 2	168	0.55	$12,767	$7,022
313.02	Voltage conversion; 3P, 4/0 ACSR	"	"	170	0.74	$12,767	$9,448
313.03	Voltage conversion; 3P, 4/0 ACSR	"	"	1701	1.28	$12,767	$16,342
313.04	Voltage conversion; 1P, 4 ACSR	"	"	172	0.48	$7,637	$3,666
313.05	Voltage conversion; 1P, 4 ACSR	"	"	1721	0.45	$7,637	$3,437
313.06	Voltage conversion; 3P, 4/0 ACSR	"	"	169	0.29	$12,767	$3,702
313.07	Voltage conversion; 3P, 1/0 ACSR	"	"	161	1.00	$12,767	$12,767
313.08	Voltage conversion; 3P, 1/0 ACSR	"	"	1611	1.15	$12,767	$14,682
313.09	Voltage conversion; 3P, 1/0 ACSR	"	"	1612	0.96	$12,767	$12,256
313.10	Voltage conversion; 1P, 4 ACSR	"	"	432	1.19	$7,637	$9,088
313.11	Voltage conversion; 1P, 4 ACSR	"	"	4321	1.02	$7,637	$7,790
313.12	Voltage conversion; 3P, 1/0 ACSR	"	"	423	0.81	$12,767	$10,341
313.13	Voltage conversion; 3P, 1/0 ACSR	"	"	424	0.84	$12,767	$10,724
313.14	Voltage conversion; 3P, 1/0 ACSR	"	"	4241	1.01	$12,767	$12,895
313.15	Voltage conversion; 3P, 1/0 ACSR	"	"	425	1.22	$12,767	$15,576
313.16	Voltage conversion; 1P, 2 ACSR	"	"	421	1.34	$7,637	$10,234
313.17	Voltage conversion; 1P, 4 ACSR	"	"	4211	1.42	$7,637	$10,845
313.18	Voltage conversion; 3P, 1/0 ACSR	"	"	426	1.28	$12,767	$16,342
313.19	Voltage conversion; 1P, 4 ACSR	Montgomery	Sideview Ckt 2	420	1.47	$7,637	$11,226
	Code Subtotal				**18.50**		**$198,383**
314	**Howell-Drennon Project**						
314.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Montgomery	Sideview Ckt 3	208	0.87	$80,313	$69,872
314.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Montgomery	Sideview Ckt 3	2081	0.84	$80,313	$67,463
	Code Subtotal				**1.71**		**$137,335**
315	**Grassy Lick Project - Part 1**						
315.01	Reconductor; 3P, 6 ACWC to 3P, 336 ACSR	Montgomery	Sideview Ckt 3	176	1.10	$80,313	$88,344
315.02	Reconductor; 3P, 6 ACWC to 3P, 336 ACSR	Montgomery	Sideview Ckt 3	202	0.51	$80,313	$40,960
	Code Subtotal				**1.61**		**$129,304**
316	**McCormick Road Project - Part 1**						
316.01	Conversion; 1P, 4 ACSR to 3P, 2 ACSR	Montgomery	Hope Ckt 3	473	1.04	$64,050	$66,612
	Code Subtotal				**1.04**		**$66,612**
317	**Spencer Road-KY 782 Project**						
317.01	Voltage conversion; 1P, 4 ACSR	Montgomery	Hope Ckt 3	4663	0.84	$7,637	$6,415
317.02	Voltage conversion; 1P, 4 ACSR	"	"	4664	0.89	$7,637	$6,797
317.03	Voltage conversion; 1P, 4 ACSR	Montgomery	Hope Ckt 3	4662	1.05	$7,637	$8,019
	Code Subtotal				**2.78**		**$21,231**

318	**Prewitt Pike-US 60 Project**						
318.01	Reconductor; 3P, 4 ACSR to 3P, 336 ACSR	Montgomery	Reid Village Ckt 2	4604	0.32	$80,313	$25,700
318.02	Reconductor; 3P, 4 ACSR to 3P, 336 ACSR	"	"	4601	0.14	$80,313	$11,244
318.03	Reconductor; 3P, 4 ACSR to 3P, 336 ACSR	Montgomery	Reid Village Ckt 2	460	0.13	$80,313	$10,441
	Code Subtotal				**0.59**		**$47,385**
319	**Cat Creek Project**						
319.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Stanton Ckt 2	761	0.60	$80,313	$48,188
319.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	762	0.15	$80,313	$12,047
319.03	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Stanton Ckt 2	7622	0.91	$80,313	$73,085
	Code Subtotal				**1.66**		**$133,320**
320	**Furnace-KY 213 Project**						
320.01	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	Powell	Stanton Ckt 3	651	0.99	$80,313	$79,510
320.02	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	"	"	6510	0.89	$80,313	$71,479
320.03	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	643	0.94	$80,313	$75,494
320.04	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Stanton Ckt 3	6431	0.55	$80,313	$44,172
	Code Subtotal				**3.37**		**$270,655**
321	**Ewing Trail Project**						
321.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Stanton Ckt 4	615	0.63	$80,313	$50,597
321.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Stanton Ckt 4	6151	0.46	$80,313	$36,944
	Code Subtotal				**1.09**		**$87,541**
322	**Morris Creek Project - Part 1**						
322.01	Reconductor; 3P, 6 ACWC to 3P, 336 ACSR	Powell	Stanton Ckt 4	5643	0.32	$80,313	$25,700
322.02	Reconductor; 3P, 6 ACWC to 3P, 336 ACSR	Powell	Stanton Ckt 4	5645	0.37	$80,313	$29,716
	Code Subtotal				**0.69**		**$55,416**
323	**Virden Ridge - Lone Oak Project**						
323.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Clay City Ckt 1	565	0.26	$80,313	$20,881
323.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Clay City Ckt 1	5651	0.99	$80,313	$79,510
	Code Subtotal				**1.25**		**$100,391**
324	**Adams Br-KY 82 Project - Part 1**						
324.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Clay City Ckt 2	606	0.25	$80,313	$20,078
324.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	6062	0.67	$80,313	$53,810
324.03	Conversion; 1P, 2 ACSR to 3P, 336 ACSR	"	"	60621	0.32	$80,313	$25,700
324.04	Conversion; 1P, 336 ACSR to 3P, 336 ACSR	"	"	6072	0.08	$80,313	$6,425
324.05	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Clay City Ckt 2	6072	0.33	$80,313	$26,503
	Code Subtotal				**1.65**		**$132,516**
325	**Adams Br-KY 82 Project - Part 2**						
325.01	Reconductor; 3P, 6 ACWC to 336 ACSR	Powell	Clay City Ckt 2	6052	0.21	$80,313	$16,866
325.02	Reconductor; 3P, 6 ACWC to 336 ACSR	"	"	568	0.08	$80,313	$6,425
325.03	Reconductor; 3P, 6 ACWC to 336 ACSR	"	"	605	0.24	$80,313	$19,275
325.04	Reconductor; 3P, 6 ACWC to 336 ACSR	Powell	Clay City Ckt 2	6053	0.39	$80,313	$31,322
	Code Subtotal				**0.92**		**$73,888**
326	**Clay City - KY 11 - Part 1**						
326.01	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	Powell	Clay City Ckt 4	525	0.52	$80,313	$41,763
326.02	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	Powell	Clay City Ckt 4	5252	1.10	$80,313	$88,344
	Code Subtotal				**1.62**		**$130,107**
327	**Hardwicks Creek**						
327.01	Voltage conversion; 3P, 1/0 ACSR	Powell	Hardwicks Ck Ckt 2	635	0.74	$12,767	$9,448
327.02	Voltage conversion; 3P, 1/0 ACSR	"	"	6361	0.19	$12,767	$2,426
327.03	Voltage conversion; 3P, 1/0 ACSR	"	"	6362	0.18	$12,767	$2,298
327.04	Voltage conversion; 3P, 1/0 ACSR	"	"	636	0.41	$12,767	$5,234
327.05	Voltage conversion; 3P, 1/0 ACSR	"	"	637	0.06	$12,767	$766
327.06	Voltage conversion; 3P, 1/0 ACSR	"	"	6372	0.80	$12,767	$10,214
327.07	Voltage conversion; 3P, 1/0 ACSR	"	"	6373	0.29	$12,767	$3,702
327.08	Voltage conversion; 1P, 4 ACSR	"	"	634	1.08	$7,637	$8,248
327.09	Voltage conversion; 1P, 4 ACSR	"	"	6341	0.77	$7,637	$5,880
327.10	Voltage conversion; 1P, 2 ACSR	"	"	6363	1.12	$7,637	$8,553
327.11	Voltage conversion; 1P, 1/0 ACSR	"	"	6371	0.53	$7,637	$4,048
327.12	Voltage conversion; 1P, 1/0 ACSR	"	"	640	1.27	$7,637	$9,699
327.13	Voltage conversion; 1P, 1/0 ACSR	"	"	6401	0.68	$7,637	$5,193
327.14	Voltage conversion; 1P, 4 ACSR	"	"	641	0.71	$7,637	$5,422
327.15	Voltage conversion; 1P, 4 ACSR	"	"	6411	0.29	$7,637	$2,215
327.16	Voltage conversion; 1P, 4 ACSR	Powell	Hardwicks Ck Ckt 2	6413	1.28	$7,637	$9,775

327.17	Voltage conversion; 1P, 4 ACSR	Powell	Hardwicks Ck Ckt 2	6414	1.22	$7,637	$9,317
327.18	Voltage conversion; 1P, 4 ACSR	"	"	6412	1.28	$7,637	$9,775
327.19	Voltage conversion; 1P, 4 ACSR	Powell	Hardwicks Ck Ckt 2	6342	1.99	$7,637	$15,198
	Code Subtotal				**14.89**		**$127,411**
328	**Frames Branch**						
328.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Hardwicks Ck Ckt 3	633	1.22	$80,313	$97,982
	Code Subtotal				**1.22**		**$97,982**
329	**Frames Branch-KY 82 Project**						
329.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Hardwicks Ck Ckt 3	6331	0.29	$80,313	$23,291
329.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	6335	0.44	$80,313	$35,338
329.03	Conversion; 1P, 336 ACSR to 3P, 336 ACSR	Powell	Hardwicks Ck Ckt 3	6335	0.11	$80,313	$8,834
	Code Subtotal				**0.84**		**$67,463**
330	**Clay City - KY 15 Project**						
330.01	Reconductor; 3P, 4/0 ACSR to 3P, 795 ACSR	Powell	Clay City Ckt 2	567	0.32	$99,716	$31,909
330.02	Reconductor; 3P, 4/0 ACSR to 3P, 795 ACSR	"	"	5671	0.51	$99,716	$50,855
330.03	Reconductor; 3P, 4/0 ACSR to 3P, 795 ACSR	Powell	Clay City Ckt 2	571	0.65	$99,716	$64,815
	Code Subtotal				**1.48**		**$147,579**
331	**Brush Creek Project**						
331.01	Conversion; 1P, 4 ACSR to 2P, 2 ACSR	Powell	Clay City Ckt 1	554	0.78	$32,566	$25,401
	Code Subtotal				**0.78**		**$25,401**
332	**Bowen School-Cat Creek Project**						
332.01	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	Powell	Bowen Ckt 3	763	0.76	$80,313	$61,038
332.02	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	Powell	Bowen Ckt 3	7631	1.03	$80,313	$82,722
	Code Subtotal				**1.79**		**$143,760**
333	**Morris Creek Project - Part 2**						
333.01	Reconductor; 3P, 397 ACSR to 3P, 795 ACSR	Powell	Stanton Ckt 4	619	0.06	$99,716	$5,983
333.02	Reconductor; 3P, 397 ACSR to 3P, 795 ACSR	"	"	6191	0.21	$99,716	$20,940
333.03	Reconductor; 3P, 397 ACSR to 3P, 795 ACSR	"	"	6193	0.14	$99,716	$13,960
333.04	Reconductor; 3P, 336 ACSR to 3P, 795 ACSR	"	"	612	0.16	$99,716	$15,955
333.05	Reconductor; 3P, 336 ACSR to 3P, 795 ACSR	"	"	6125	0.12	$99,716	$11,966
333.06	Reconductor; 3P, 336 ACSR to 3P, 795 ACSR	Powell	Stanton Ckt 4	6127	0.06	$99,716	$5,983
	Code Subtotal				**0.75**		**$74,787**
	Subtotal - Code 300's				**85.24 Miles**		**$3,964,989**
Code	**Miscellaneous Distribution Equipment & Replacements**						**Total Cost**
	Description				Quantity	Cost	
601	Underground Meters				570	$123	$70,110
	Overhead Meters				1330	$123	$163,590
	Underground Transformers				1114	$800	$891,200
	Overhead Transformers				2600	$800	$2,080,000
	Total Transformers and Meters						$3,204,900
602	Service Entrance Changes				354	$930	$329,220
603	Three-Phase Reclosers - Electronic				13	$20,000	$260,000
	Single-Phase Reclosers - Hydraulic				120	$3,500	$420,000
	Single-Phase Reclosers - Electronic				12	$8,000	$96,000
	Air Break Switches				12	$5,000	$60,000
	Sectionalizing Activities, e.g. Cutouts, Switches, Arresters						$500,000
	Total Sectionalizing Equipment & Activities						$1,336,000
604	100 Amp Voltage Regulators				18	$8,500	$153,000
605	600 kVAR Switched Capacitor Banks, Appurtenances, & Controls				16	$2,500	$40,000
606	System Pole Replacements				1086	$953	$1,034,958
701	Security Light Installations				1518	$224	$340,032
	Subtotal - Misc. Dist. Equip. & Replacements						**$6,438,110**
1300	Headquarters Office Renovation & Expansion Project						$1,200,000
	Construction Work Plan Total						**$17,477,087**

7.2 Regulation Requirements

Voltage regulators are routinely installed to improve voltage levels in circumstances where major project construction may be reasonably deferred without violating design criteria or reliability. The load flow analysis reveals areas of the distribution system requiring regulation scheme changes to improve voltage levels at the CWP design load. Installing additional voltage regulation, however, is often an interim measure before distribution system improvements are required. An eight volt drop criteria between each regulated bus or circuit line section throughout the primary system is maintained for all changes in regulation schemes to provide adequate customer service. Voltage level design criteria were earlier presented within Section 4.4, Voltage Criteria. All proposed voltage regulation changes required through the CWP period are illustrated in Table No. 26 on the next page. Estimated costs for additional voltage regulators are included within the CWP and LRP.

7.3 Capacitor Requirements

Additional capacitor banks are recommended for installation at strategic feeder circuit locations on the distribution system. Capacitors have characteristics offering several benefits to distribution system operations. Capacitors locally supply the reactive power needs of distribution loads to improve system power factor, reduce system losses and lower peak demand. Voltage regulation is generally improved and capacity is released on the affected feeder and substation. Capacity is similarly released on area transmission lines and generation although these benefits are often less tangible to evaluate. New capacitor banks are evaluated using a variety of placement criteria. First, a load flow analysis of the distribution system is used to develop an initial capacitor placement that minimizes feeder losses. The effect of proposed capacitor banks on feeder and substation power factor is next reviewed to ensure wholesale power factor penalties are avoided. Finally, the effect of proposed capacitor banks during peak- and light-load conditions is reviewed to ensure power factor will not exceed 98-percent leading or 126-Volts. Switched capacitor banks are needed when fixed banks create excessive leading power factor or voltage. Anticipated capacitor bank changes are illustrated in Table No. 26 on the next page. Estimated costs for capacitor bank controls are included within the CWP and LRP.

7.4 Sectionalizing Requirements

An objective of Clark's ongoing sectionalizing program is to improve distribution system reliability. System protection schemes are updated on an ongoing basis as circuit conditions change with load growth. Protective coordination and sectionalizing activities will continue through the 2003-2005 CWP and 2008 LRP period. Design criteria and guidelines governing all sectionalizing activities were earlier presented in Section 4.5, Sectionalizing Criteria. Anticipated changes to present sectionalizing schemes over the period of the 2003-2005 CWP are illustrated within Table No. 26 on the next page. Estimated costs for sectionalizing activities and equipment are included within the CWP and LRP.

Table No. 26
Anticipated Regulator, Capacitor & Sectionalizing Changes

Circuit	LS	Regulator Changes (1Φ or 3Φ)				Capacitor Changes (kVAR)				Recloser Changes
		Source	Load	Install	Retire	Source	Load	Install	Retire	
Blevins Valley Ckt 2	7015		√	3Φ						
Bowen Ckt 1										Add 1-VWVE and 4-V4Es.
Bowen Ckt 2	7701		√	1Φ						
Bowen Ckt 3	767						√	300		
	7544		√	1Φ						
Clay City Ckt 1	553						√	300	150	Add 1-V4E.
	557						√	300		
Clay City Ckt 2	571						√		150	Add 3-V4Es.
	573						√	300	150	
	604		√	3Φ						
	6053						√	300		
Clay City Ckt 4										Add 1-VWVE.
Frenchburg Ckt 1	1054		√		3Φ					
	10522		√	3Φ			√	300		
	10612						√	150		
Frenchburg Ckt 2										Add 1-VWVE.
Frenchburg Ckt 3	1067		√	3Φ						Add 1-VWVE and 3-V4Es.
	10771						√	300	150	
Frenchburg Ckt 4	1135						√	450		
	1140		√		1Φ					
	1063		√	3Φ						
	10772		√		3Φ					
	11333					√			150	
	113431						√	450		
Hardwicks Creek Ckt 1	610						√	150		
	6102						√		300	
Hardwicks Creek Ckt 2										Add 2-V4Es.
Hardwicks Creek Ckt 3	633						√	150		Add 2-V4Es.
Hinkston Ckt 1										Add 6-V4Es.
Hunt Ckt 1	26702						√	300		
Hunt Ckt 2										Add 1-V4E.
Hunt Ckt 3	374		√		3Φ					
	3611		√	3Φ						
Hunt Ckt 4										Add 1-V4E.
Jeffersonville Ckt 1	5366						√	300		Add 3-V4Es.
Jeffersonville Ckt 2	727						√		150	
	730						√	300		
Mariba Ckt 1	11121	√		1Φ						
Mariba Ckt 2										Add 3-V4Es.
Mariba Ckt 3	1116		√		3Φ					
	11144						√	150		
	11162		√	3Φ						
	111622						√		150	
Miller Hunt Ckt 1	230		√	3Φ			√	300		Add 1-VWVE and 4-V4Es.
Miller Hunt Ckt 2	262		√		3Φ					Add 6-V4Es.
Miller Hunt Ckt 3	235						√	150		Add 1-V4E.
Mt. Sterling Ckt 2	5211		√		1Φ					
Mt. Sterling Ckt 3										Add 1-V4E.
Reid Village Ckt 1	2273						√	300		
Sideview Ckt 1	144	√		1Φ						Add 2-V4Es.
Sideview Ckt 2	1612		√	3Φ						Add 2-VWVEs and 4-V4Es.
Sideview Ckt 3	2023		√	3Φ						
Sideview Ckt 4	213	√		1Φ						
Stanton Ckt 1										Add 4-V4Es.
Stanton Ckt 2	761						√	300		
	6278						√	300	150	
Stanton Ckt 3	631						√	300	150	Add 5-V4Es.
	651						√	300		
	6299						√	300	150	
Stanton Ckt 4	564						√	600		Add 3-V4Es.
	612					√		600	300	
	614						√		300	
	615					√		300		
	6120					√		150		
	6128					√		150		
	56225		√	1Φ						
Trapp Ckt 1	3252						√	150		Add 1-VWVE and 5-V4Es.
Trapp Ckt 3										Add 5-V4Es.
Van Meter Ckt 1	1325						√	300		
Van Meter Ckt 3										Add 2-V4Es.

7.5 Headquarters Facility Improvements

Clark's headquarters office facilities are recommended for renovation and expansion to serve present and future needs throughout all functional areas and businesses of the cooperative. Most of the existing office facilities occupy the original headquarters building constructed in the early 1950s. The original warehouse and garage attached to the main headquarters were converted to office space in the 1960s to accommodate the cooperative's growth. Separate warehouse and garage space was built on the grounds at that time. An additional office wing was constructed in the early 1970s. These facilities have periodically been remodeled over the past thirty years as business needs and staffing continued to change over time. Office space and staffing needs throughout the cooperative, however, can no longer be accommodated by existing offices and a renovation of existing areas and expansion into new space is needed.

The existing headquarters provides about 12,200 square feet of office space. A renovation and expansion plan proposed by DCT Design Group, Ltd of Lexington, KY proposes redesign of much of the existing space and construction of an expanded front lobby, operations and dispatch area. Total new space for these areas is about 4,200 square feet. Aside from a new front lobby, operations and dispatch area, the renovation and expansion project provides additional office space, meeting rooms, training area and a new board room. The estimated $1.2 million project will conform with all applicable building, seismic and disability codes per DCT Design Group's letter provided within the Appendix. A floor plan of the headquarters office project accompanies this document. Similarly, a cost breakdown of the project is provided by RUS Form 740G within the Appendix.

8 Proposed 2008 LRP Program

The LRP anticipates distribution system improvements and other routine plant changes over a five-year planning horizon consistent with all design criteria to ensure orderly expansion of the electric system. The CWP is an action plan to begin implementation of LRP recommendations and anticipates distribution improvements to serve a short-term design load. Short-terms goals addressed in the CWP are consistent with all needs anticipated within the LRP. A majority of CWP costs is for routine activities such as new service construction, service upgrades, pole and primary conductor replacements, meters, transformers and security lights. Similarly, most LRP costs are for the same activities. An overview of proposed 2003-2005 CWP and 2008 LRP activities, projects and programs is provided in Table No. 27 below. A detailed presentation of these costs is provided in a format similar to the RUS Form 740C on pages 52-57.

Table No. 27
Summary of 2003-2005 CWP and 2008 LRP

Description or Category	2003-2005 CWP - $17,477,087		2008 LRP - $33,589,075	
	Quantity/Miles	Cost	Quantity/Miles	Cost
New Services	2601	$5,873,988	5202	$12,293,088
Service Upgrades	354	$329,220	708	$688,884
New Security Lights	1518	$340,032	3036	$710,424
Pole Replacements	1086	$1,034,958	2172	$2,165,484
New Meters	1900	$233,700	6800	$877,200
New Transformers	3714	$2,971,200	7428	$6,217,236
System Improvements	85.24-miles	$3,964,989	115.63-miles	$6,545,426
Equipment & Sectionalizing		$1,529,000		$2,891,333
Office Renovation & Expansion		$1,200,000		$1,200,000

The 2008 LRP is a guide for developing a reliable distribution system satisfying all long-term needs at forecast loads that is consistent with design criteria at the least cost. All proposed system improvement projects are identified with engineering analysis software to review the adequacy of the electric system at design loads using a variety of design criteria. Operational considerations also help identify LRP needs. Maintaining a proper voltage level is generally the most limiting criteria when evaluating proposed system improvement projects. Similarly, proposed projects are evaluated using other design criteria for capacity, phase balance, sectionalization and reliability considerations. All LRP, CWP and substation evaluation design criteria were earlier presented within Section 4. The recommended LRP program of long-term system improvements includes a variety of conversion, reconductoring and 24.9 kV conversion projects. Similarly, the recommended program reviews anticipated routine plant replacements of older overhead conductor and poles as the distribution system ages. Projected replacements are provided on page 51. A descriptive summary of proposed LRP system improvement projects is provided in Table No. 28 on the next page. Proposed projects are illustrated by code with before and after voltage levels on system maps accompanying this document. A list by code and line section for all projects is provided in a format similar to the RUS Form 740C on pages 52-57.

Table No. 28
Summary of 2008 Long Range Plan System Improvement Projects

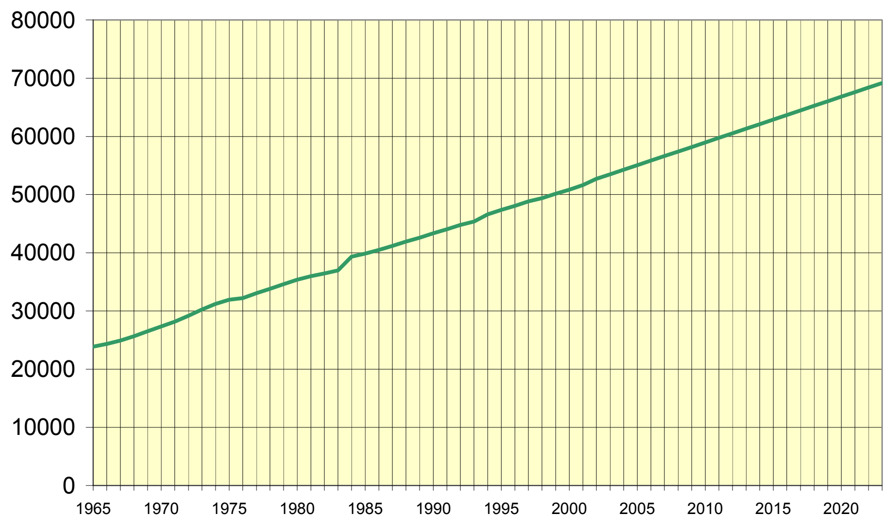
Code	Cost	Year	Project	County	Circuit	Scope (miles)				Rationale (One or More)				Design Criteria	Comments
						Conductor	Conversion	Reconductor	25 kV	Voltage	Balance	Capacity	Reliability		
CWP	$3,964,989		2003-2005 CWP				36.21	9.54	39.49						
LR1	$89,147	2008	Olympia	Bath	Blevins Valley 2	336 ACSR	1.11			√		√		√	Re-evaluate Olympia Spg Sub.
LR2	$103,604		Olympia-KY36		Blevins Valley 2	336 ACSR	1.29						√	√	Re-evaluate Olympia Spg Sub.
LR3	$194,357		Olympia Spg-KY36		Frenchburg 1	336 ACSR	2.42						√	√	Re-evaluate Olympia Spg Sub.
LR4	$122,076	2007	Steele Rd-Plum Lick	Bourbon	Sideview 1	336 ACSR	1.52			√	√			√	
LR5	$52,203	2008	Escondida	Clark	Van Meter 3	336 ACSR	0.65				√			√	
LR6	$33,174		Rockwell Village		Treehaven 3	1/0 Al UD		0.30					√	√	UD cable replacement.
LR7	$28,110	2008	Flint Road	Madison	Hunt 3	336 ACSR	0.35				√			√	
LR8	$353,376	2006	Frenchburg-KY36	Menifee	Frenchburg 1	336 ACSR		4.40		√	√			√	Re-evaluate Olympia Spg Sub.
LR9	$173,476	2008	Indian Ck-US460(2)		Frenchburg 3	336 ACSR		2.16				√	√	√	Maintain backfeed capability.
LR10	$85,934		Dan Rg-KY1053(2)		Frenchburg 4	336 ACSR	1.07			√	√			√	
LR11	$14,456		Dan Rg-KY1053(3)		Frenchburg 4	336 ACSR	0.18						√	√	US460-Korea-Dan Rg intertie.
LR12	$239,332		Wellington-Korea		Mariba 2	336 ACSR	2.98						√	√	US460-Korea-Dan Rg intertie.
LR13	$72,282	2007	Cream Alley-KY213	Montgomery	Jeffersonville 1	336 ACSR	0.90				√			√	
LR14	$58,286	2008	McCormick Road(2)		Hope 3	2 ACSR	0.91				√			√	
LR15	$65,054		Grassy Lick(2)		Sideview 3	336 ACSR		0.81		√		√		√	
LR16	$216,845		Grassy Lick(3)		Sideview 3	336 ACSR		2.70					√	√	Maintain backfeed capability.
LR17	$175,885		Grassy Lick(4)		Reid Village 1	336 ACSR		2.19					√	√	Maintain backfeed capability.
LR18	$66,660	2007	Virden-West Bend	Powell	Clay City 1	336 ACSR		0.83				√	√	√	Maintain backfeed capability.
LR19	$154,201	2008	Clay City-KY11(2)		Clay City 4	336 ACSR	1.92						√	√	Black Ck-Levee-KY 11 intertie.
LR20	$281,979	2008	Twin Knobs	Rowan	Cave Run 1	1/0 Al UD		1.70					√	√	UD cable replacement.
LRP	$2,580,437		2008 LRP				15.30	15.09							
Total	$6,545,426						51.51	24.63	39.49						

1. The "Scope" portion of the table summarizes the proposed conductor (if any) and the miles of conversion, reconductoring and/or 25 kV voltage conversion required for each project. Brief notes are included within the "Comments" column. See the 740C Form within the Appendix for a detailed listing of circuit configuration changes and costs by line section number for each project.
2. The "Rationale" portion of the table summarizes as a check mark (√) where the existing system fails to satisfy one or more design criteria and conditions the project will correct or improve. A "Voltage" √-mark means the existing system fails to satisfy the 8- and 16-Volt drop criteria with no more than one tier of line regulation presented in Section 4.4. A "Balance" √-mark means the existing system fails to satisfy the 56-Amp single-phase loading criteria presented in Section 4.5. A "Capacity" √-mark means the existing system fails to satisfy conductor loading criteria of 80-percent or 50-percent of thermal rating on radial and intertie circuits respectively presented in Section 4.6. A "Reliability" √-mark identifies that a project is needed to improve backfeed capabilities and/or aging conductor is recommended for replacement.
3. The "Design Criteria" portion of the table summarizes as a √-mark that a proposed project satisfies all design criteria presented in Section 4, "Preparation of LRP, CWP and Substation Evaluation Design".

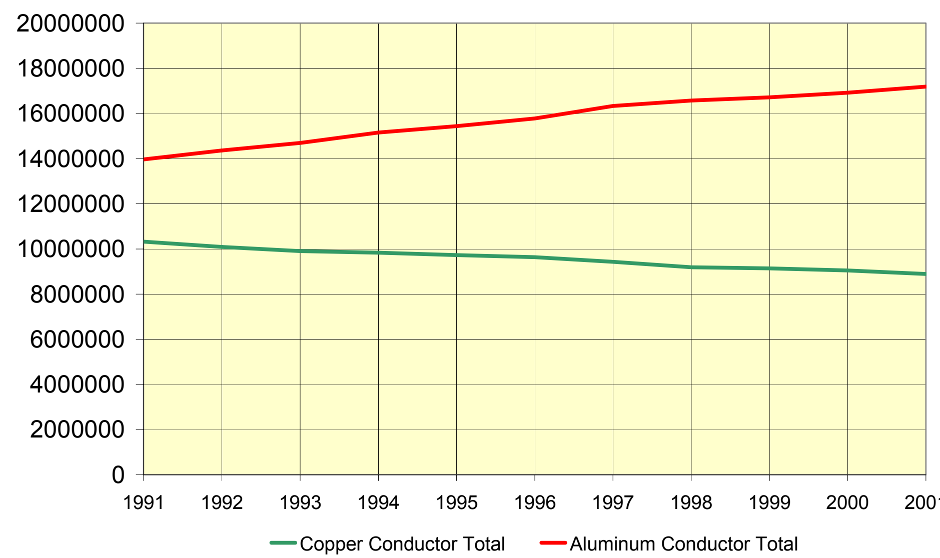
Projected Pole and Overhead Copper Conductor Costs

Item Description and Costs		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Projected No. of Distribution Poles		54258	55044	55829	56614	57400	58185	58970	59755	60541	61326	62111	62896	63682	64467	65252	66038	66823	67608	68393	69179
Projected No. of Pole Replacements		824	1032	1072	958	717	262	894	744	780	770	608	464	528	2379	505	630	705	728	671	763
Current Replacement Capital Cost @	$953.00	$785,272	$983,496	$1,021,616	$912,974	$683,301	$249,686	$851,982	$709,032	$743,340	$733,810	$579,424	$442,192	$503,184	$2,267,187	$481,265	$600,390	$671,865	$693,784	$639,463	$727,139
Projected Replacement Capital Cost @	2.33%	$785,272	$1,006,411	$1,069,778	$978,289	$749,245	$280,162	$978,246	$833,080	$893,740	$902,839	$729,502	$569,697	$663,380	$3,058,623	$664,394	$848,161	$971,247	$1,026,301	$967,986	$1,126,352
Cumulative Replacement Capital Cost		$785,272	$1,791,683	$2,861,461	$3,839,751	$4,588,996	$4,869,158	$5,847,404	$6,680,484	$7,574,224	$8,477,064	$9,206,565	$9,776,262	$10,439,642	$13,498,265	$14,162,660	$15,010,820	$15,982,067	$17,008,368	$17,976,354	$19,102,705
Pole Replacement System Cost Rate @	16.58%	$130,198	$297,061	$474,430	$636,631	$760,856	$807,306	$969,500	$1,107,624	$1,255,806	$1,405,497	$1,526,448	$1,620,904	$1,730,893	$2,238,012	$2,348,169	$2,488,794	$2,649,827	$2,819,987	$2,980,479	$3,167,229
Annual Pole Replacement Cost		$130,198	$297,061	$474,430	$636,631	$760,856	$807,306	$969,500	$1,107,624	$1,255,806	$1,405,497	$1,526,448	$1,620,904	$1,730,893	$2,238,012	$2,348,169	$2,488,794	$2,649,827	$2,819,987	$2,980,479	$3,167,229
Projected Footage of Copper OH Conductor		8463758	8325692	8187626	8049560	7911494	7773428	7635363	7497297	7359231	7221165	7083099	6945033	6806967	6668901	6530836	6392770	6254704	6116638	5978572	5840506
Projected Footage of Copper Replacements		138066	138066	138066	138066	138066	138066	138065	138066	138066	138066	138066	138066	138066	138066	138065	138066	138066	138066	138066	138066
Current Replacement Capital Cost @	$1.27	$175,344	$175,344	$175,344	$175,344	$175,344	$175,344	$175,343	$175,344	$175,344	$175,344	$175,344	$175,344	$175,344	$175,344	$175,343	$175,344	$175,344	$175,344	$175,344	$175,344
Projected Replacement Capital Cost @	2.33%	$175,344	$179,429	$183,610	$187,888	$192,266	$196,746	$201,328	$206,021	$210,821	$215,733	$220,760	$225,904	$231,167	$236,553	$242,063	$247,705	$253,477	$259,383	$265,426	$271,611
Cumulative Replacement Captial Cost		$175,344	$354,773	$538,383	$726,271	$918,537	$1,115,283	$1,316,611	$1,522,632	$1,733,454	$1,949,187	$2,169,947	$2,395,850	$2,627,018	$2,863,571	$3,105,634	$3,353,339	$3,606,816	$3,866,199	$4,131,625	$4,403,236
Copper Replacement System Cost Rate @	16.58%	$29,072	$58,821	$89,264	$120,416	$152,293	$184,914	$218,294	$252,452	$287,407	$323,175	$359,777	$397,232	$435,560	$474,780	$514,914	$555,984	$598,010	$641,016	$685,023	$730,057
Annual OH Copper Replacement Cost		$29,072	$58,821	$89,264	$120,416	$152,293	$184,914	$218,294	$252,452	$287,407	$323,175	$359,777	$397,232	$435,560	$474,780	$514,914	$555,984	$598,010	$641,016	$685,023	$730,057
Annual Pole Replacement Cost		$130,198	$297,061	$474,430	$636,631	$760,856	$807,306	$969,500	$1,107,624	$1,255,806	$1,405,497	$1,526,448	$1,620,904	$1,730,893	$2,238,012	$2,348,169	$2,488,794	$2,649,827	$2,819,987	$2,980,479	$3,167,229
Annual OH Copper Replacement Cost		$29,072	$58,821	$89,264	$120,416	$152,293	$184,914	$218,294	$252,452	$287,407	$323,175	$359,777	$397,232	$435,560	$474,780	$514,914	$555,984	$598,010	$641,016	$685,023	$730,057
Total Annual Replacement Cost		$159,270	$355,883	$563,694	$757,046	$913,149	$992,220	$1,187,794	$1,360,077	$1,543,213	$1,728,672	$1,886,226	$2,018,136	$2,166,452	$2,712,792	$2,863,083	$3,044,778	$3,247,837	$3,461,003	$3,665,503	$3,897,285
PV Annual Total Replacement Cost @	7.30%	$159,270	$331,671	$489,603	$612,807	$688,879	$697,605	$778,292	$830,549	$878,270	$916,886	$932,387	$929,723	$930,149	$1,085,476	$1,067,672	$1,058,180	$1,051,959	$1,044,736	$1,031,190	$1,021,804
Cumulative PV Replacement Cost	$16,537,107	$159,270	$490,941	$980,544	$1,593,350	$2,282,229	$2,979,834	$3,758,126	$4,588,675	$5,466,945	$6,383,831	$7,316,218	$8,245,941	$9,176,090	$10,261,566	$11,329,238	$12,387,419	$13,439,377	$14,484,114	$15,515,303	$16,537,107

Distribution Pole Plant



Total Conductor in Plant (ft)



2008 Long Rang Plan
Distribution Cost Estimates - RUS Form 740C

Code	Service Membership				Total Cost
	Description	Miles	Quantity	Cost	
100	Underground Service Membership Construction	66.00	1506	$2,096	$3,156,576
	Overhead Service Membership Construction	240.00	3696	$2,472	$9,136,512
	Subtotal				**$12,293,088**

Code	New Tie-Lines						Total Cost
	Description	County	Circuit	LS	Miles	Cost/Mi	
	Subtotal - Code 200's						

Code	Conversion and Line Changes						Total Cost
	Description	County	Circuit	LS	Miles	Cost/Mi	
301	**Mud Lick Project**						
301.01	Conversion; 1P, 4 ACSR to 2P, 2 ACSR	Bath	Blevins Valley Ckt 2	10224	0.19	$32,566	$6,188
301.02	Conversion; 1P, 4 ACSR to 2P, 2 ACSR	Bath	Blevins Valley Ckt 2	1022	1.06	$32,566	$34,520
	Code Subtotal				**1.25**		**$40,708**
LR1	**Olympia Project**						
	Conversion; 2P, 4 ACSR to 3P, 336 ACSR	Bath	Blevins Valley Ckt 2	702	1.11	$80,313	$89,147
	Code Subtotal				**1.11**		**$89,147**
LR2	**Olympia-KY 36**						
	Conversion; 2P, 4 ACSR to 3P, 336 ACSR	Bath	Blevins Valley Ckt 2	7021	0.79	$80,313	$63,447
	Conversion; 2P, 4 ACSR to 3P, 336 ACSR	"	"	10376	0.07	$80,313	$5,622
	Conversion; 2P, 4 ACSR to 3P, 336 ACSR	Bath	Blevins Valley Ckt 2	1037	0.43	$80,313	$34,535
	Code Subtotal				**1.29**		**$103,604**
LR3	**Olympia Springs-KY36**						
	Conversion; 2P, 6 ACWC to 3P, 336 ACSR	Bath	Frenchburg Ckt 1	1040	0.87	$80,313	$69,872
	Conversion; 2P, 4 ACSR to 3P, 336 ACSR	"	"	10375	1.42	$80,313	$114,044
	Conversion; 2P, 4 ACSR to 3P, 336 ACSR	Bath	Frenchburg Ckt 1	10372	0.13	$80,313	$10,441
	Code Subtotal				**2.42**		**$194,357**
LR4	**Steele Road-Plum Lick Project**						
	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Bourbon	Sideview Ckt 1	145	0.97	$80,313	$77,904
	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Bourbon	Sideview Ckt 1	1451	0.55	$80,313	$44,172
	Code Subtotal				**1.52**		**$122,076**
302	**Big Stoner Project**						
302.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Clark	Sideview Ckt 4	175	1.04	$80,313	$83,526
302.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	200	1.51	$80,313	$121,273
302.03	Conversion; 1P, 2 ACSR to 3P, 336 ACSR	Clark	Sideview Ckt 4	2002	0.57	$80,313	$45,778
	Code Subtotal				**3.12**		**$250,577**
303	**Kiddville-Schollsville Project**						
303.01	Voltage conversion; 1P, 4 ACSR	Clark	Miller Hunt Ckt 1	255	1.36	$7,637	$10,386
303.02	Voltage conversion; 1P, 4 ACSR	"	"	256	0.91	$7,637	$6,950
303.03	Voltage conversion; 1P, 4 ACSR	Clark	Miller Hunt Ckt 1	25600	1.05	$7,637	$8,019
	Code Subtotal				**3.32**		**$25,355**
304	**Trapp-Goff Corner Project**						
304.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Clark	Trapp Ckt 1	31400	0.62	$80,313	$49,794
304.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	314	0.47	$80,313	$37,747
304.03	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	3141	0.07	$80,313	$5,622
304.04	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	326	0.63	$80,313	$50,597
304.05	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	3262	0.63	$80,313	$50,597
304.06	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Clark	Trapp Ckt 1	3263	0.29	$80,313	$23,291
	Code Subtotal				**2.71**		**$217,648**

305	**Dry Fork-Ruckerville-Pilot View Project**						
305.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Clark	Miller Hunt Ckt 2	2712	0.21	$80,313	$16,866
305.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	2711	0.53	$80,313	$42,566
305.03	Conversion; 1P, 336 ACSR to 3P, 336 ACSR	"	"	2711	0.15	$80,313	$12,047
305.04	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	2721	0.44	$80,313	$35,338
305.05	Conversion; 1P, 336 ACSR to 3P, 336 ACSR	"	"	2721	0.23	$80,313	$18,472
305.06	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Clark	Miller Hunt Ckt 2	3032	0.52	$80,313	$41,763
	Code Subtotal				**2.08**		**$167,052**
306	**Clintonville-Thatchers Mill Project**						
306.01	Reconductor; 3P, 1/0 ACSR to 3P, 336 ACSR	Clark	Van Meter Ckt 3	25	1.19	$80,313	$95,572
306.02	Reconductor; 3P, 1/0 ACSR to 3P, 336 ACSR	"	"	1325	0.90	$80,313	$72,282
306.03	Reconductor; 3P, 1/0 ACSR to 3P, 336 ACSR	"	"	17	0.48	$80,313	$38,550
306.04	Reconductor; 3P, 1/0 ACSR to 3P, 336 ACSR	Clark	Van Meter Ckt 3	15	0.22	$80,313	$17,669
	Code Subtotal				**2.79**		**$224,073**
307	**Winetown Project**						
307.01	Conversion; 2P, 4 ACSR to 3P, 336 ACSR	Clark	Miller Hunt Ckt 1	2222	0.58	$80,313	$46,582
307.02	Conversion; 2P, 4 ACSR to 3P, 336 ACSR	Clark	Miller Hunt Ckt 1	222	0.56	$80,313	$44,975
	Code Subtotal				**1.14**		**$91,557**
308	**Sewell Shop-US 60 Project**						
308.01	Conversion; 2P, 4 ACSR to 3P, 336 ACSR	Clark	Reid Village Ckt 1	225	0.15	$80,313	$12,047
308.02	Conversion; 2P, 4 ACSR to 3P, 336 ACSR	"	"	2252	0.73	$80,313	$58,628
308.03	Conversion; 2P, 4 ACSR to 3P, 336 ACSR	Clark	Reid Village Ckt 1	2253	0.70	$80,313	$56,219
	Code Subtotal				**1.58**		**$126,894**
LR5	**Escondida Project**						
	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Clark	Van Meter Ckt 3	11	0.65	$80,313	$52,203
	Code Subtotal				**0.65**		**$52,203**
LR6	**Rockwell Village UD Project**						
	Replace UD; 1P, 1/0 w/ 1P, 1/0 AC	Clark	Treehaven Ckt 3	1303	0.30	$110,580	$33,174
	Code Subtotal				**0.30**		**$33,174**
LR7	**Flint Road Project**						
	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Madison	Hunt Ckt 3	410	0.35	$80,313	$28,110
	Code Subtotal				**0.35**		**$28,110**
309	**Dan Ridge Project - Part 1**						
309.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Menifee	Frenchburg Ckt 4	11354	0.61	$80,313	$48,991
309.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Menifee	Frenchburg Ckt 4	11356	1.01	$80,313	$81,116
	Code Subtotal				**1.62**		**$130,107**
310	**Indian Creek-U.S. 460 Project - Part 1**						
310.01	Reconductor; 3P, 2 ACSR to 3P, 336 ACSR	Menifee	Frenchburg Ckt 3	1071	0.56	$80,313	$44,975
310.02	Reconductor; 3P, 2 ACSR to 3P, 336 ACSR	Menifee	Frenchburg Ckt 3	10711	0.15	$80,313	$12,047
	Code Subtotal				**0.71**		**$57,022**
LR8	**Frenchburg-KY 36**						
	Reconductor; 3P, 6 ACWC to 336 ACSR	Menifee	Frenchburg Ckt 1	1061	0.49	$80,313	$39,353
	Reconductor; 3P, 6 ACWC to 336 ACSR	"	"	10612	1.15	$80,313	$92,360
	Reconductor; 3P, 4 ACSR to 336 ACSR	"	"	1054	0.95	$80,313	$76,297
	Reconductor; 3P, 4 ACSR to 336 ACSR	"	"	10541	0.71	$80,313	$57,022
	Reconductor; 3P, 4 ACSR to 336 ACSR	"	"	1052	0.22	$80,313	$17,669
	Reconductor; 3P, 4 ACSR to 336 ACSR	Menifee	Frenchburg Ckt 1	10522	0.88	$80,313	$70,675
	Code Subtotal				**4.40**		**$353,376**
LR9	**Indian Creek-U.S. 460 Project - Part 2**						
	Reconductor; 3P, 1/0 CU to 3P, 336 ACSR	Menifee	Frenchburg Ckt 3	1073	0.63	$80,313	$50,597
	Reconductor; 3P, 2 ACSR to 3P, 336 ACSR	Menifee	"	1067	0.69	$80,313	$55,416
	Reconductor; 3P, 1/0 CU to 3P, 336 ACSR	Menifee	Frenchburg Ckt 3	10732	0.84	$80,313	$67,463
	Code Subtotal				**2.16**		**$173,476**
LR10	**Dan Ridge Project - Part 2**						
	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Menifee	Frenchburg Ckt 4	1140	0.34	$80,313	$27,306
	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Menifee	"	11402	0.57	$80,313	$45,778
	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Menifee	Frenchburg Ckt 4	11450	0.16	$80,313	$12,850
	Code Subtotal				**1.07**		**$85,934**

LR11	**Dan Ridge Project - Part 3**						
	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	Menifee	Frenchburg Ckt 4	11457	0.18	$80,313	$14,456
	Code Subtotal				**0.18**		**$14,456**
LR12	**Wellington-Korea Project**						
	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	Menifee	Mariba Ckt 2	11302	0.55	$80,313	$44,172
	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	11459	0.11	$80,313	$8,834
	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	1145	0.94	$80,313	$75,494
	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	11454	0.41	$80,313	$32,928
	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	Menifee	Mariba Ckt 2	11456	0.97	$80,313	$77,904
	Code Subtotal				**2.98**		**$239,332**
311	**Levee-Hwy 11 Project**						
311.01	Conversion; 1P, 336 ACSR to 3P, 336 ACSR	Montgomery	Mt. Sterling Ckt 2	5216	0.12	$80,313	$9,638
311.02	Conversion; 1P, 336 ACSR to 3P, 336 ACSR	"	"	521	0.94	$80,313	$75,494
311.03	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	"	"	5211	0.22	$80,313	$17,669
311.04	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	"	"	5213	0.39	$80,313	$31,322
311.05	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	"	"	5215	0.71	$80,313	$57,022
311.06	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	5433	0.14	$80,313	$11,244
311.07	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Montgomery	Mt. Sterling Ckt 2	5431	1.19	$80,313	$95,572
	Code Subtotal				**3.71**		**$297,961**
312	**O'Rear Project**						
312.01	Conversion; 1P, 6 ACWC to 3P, 1/0 ACSR	Montgomery	Mt. Sterling Ckt 2	5210	0.98	$68,947	$67,568
	Code Subtotal				**0.98**		**$67,568**
313	**Aarons Run - Bunker Hill Project**						
313.01	Voltage conversion; 3P, 4/0 ACSR	Montgomery	Sideview Ckt 2	168	0.55	$12,767	$7,022
313.02	Voltage conversion; 3P, 4/0 ACSR	"	"	170	0.74	$12,767	$9,448
313.03	Voltage conversion; 3P, 4/0 ACSR	"	"	1701	1.28	$12,767	$16,342
313.04	Voltage conversion; 1P, 4 ACSR	"	"	172	0.48	$7,637	$3,666
313.05	Voltage conversion; 1P, 4 ACSR	"	"	1721	0.45	$7,637	$3,437
313.06	Voltage conversion; 3P, 4/0 ACSR	"	"	169	0.29	$12,767	$3,702
313.07	Voltage conversion; 3P, 1/0 ACSR	"	"	161	1.00	$12,767	$12,767
313.08	Voltage conversion; 3P, 1/0 ACSR	"	"	1611	1.15	$12,767	$14,682
313.09	Voltage conversion; 3P, 1/0 ACSR	"	"	1612	0.96	$12,767	$12,256
313.10	Voltage conversion; 1P, 4 ACSR	"	"	432	1.19	$7,637	$9,088
313.11	Voltage conversion; 1P, 4 ACSR	"	"	4321	1.02	$7,637	$7,790
313.12	Voltage conversion; 3P, 1/0 ACSR	"	"	423	0.81	$12,767	$10,341
313.13	Voltage conversion; 3P, 1/0 ACSR	"	"	424	0.84	$12,767	$10,724
313.14	Voltage conversion; 3P, 1/0 ACSR	"	"	4241	1.01	$12,767	$12,895
313.15	Voltage conversion; 3P, 1/0 ACSR	"	"	425	1.22	$12,767	$15,576
313.16	Voltage conversion; 1P, 2 ACSR	"	"	421	1.34	$7,637	$10,234
313.17	Voltage conversion; 1P, 4 ACSR	"	"	4211	1.42	$7,637	$10,845
313.18	Voltage conversion; 3P, 1/0 ACSR	"	"	426	1.28	$12,767	$16,342
313.19	Voltage conversion; 1P, 4 ACSR	Montgomery	Sideview Ckt 2	420	1.47	$7,637	$11,226
	Code Subtotal				**18.50**		**$198,383**
314	**Howell-Drennon Project**						
314.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Montgomery	Sideview Ckt 3	208	0.87	$80,313	$69,872
314.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Montgomery	Sideview Ckt 3	2081	0.84	$80,313	$67,463
	Code Subtotal				**1.71**		**$137,335**
315	**Grassy Lick Project - Part 1**						
315.01	Reconductor; 3P, 6 ACWC to 3P, 336 ACSR	Montgomery	Sideview Ckt 3	176	1.10	$80,313	$88,344
315.02	Reconductor; 3P, 6 ACWC to 3P, 336 ACSR	Montgomery	Sideview Ckt 3	202	0.51	$80,313	$40,960
	Code Subtotal				**1.61**		**$129,304**
316	**McCormick Road Project - Part 1**						
316.01	Conversion; 1P, 4 ACSR to 3P, 2 ACSR	Montgomery	Hope Ckt 3	473	1.04	$64,050	$66,612
	Code Subtotal				**1.04**		**$66,612**
317	**Spencer Road-KY 782 Project**						
317.01	Voltage conversion; 1P, 4 ACSR	Montgomery	Hope Ckt 3	4663	0.84	$7,637	$6,415
317.02	Voltage conversion; 1P, 4 ACSR	"	"	4664	0.89	$7,637	$6,797
317.03	Voltage conversion; 1P, 4 ACSR	Montgomery	Hope Ckt 3	4662	1.05	$7,637	$8,019
	Code Subtotal				**2.78**		**$21,231**
318	**Prewitt Pike-US 60 Project**						
318.01	Reconductor; 3P, 4 ACSR to 3P, 336 ACSR	Montgomery	Reid Village Ckt 2	4604	0.32	$80,313	$25,700
318.02	Reconductor; 3P, 4 ACSR to 3P, 336 ACSR	"	"	4601	0.14	$80,313	$11,244

318.03	Reconductor; 3P, 4 ACSR to 3P, 336 ACSR	Montgomery	Reid Village Ckt 2	460	0.13	$80,313	$10,441
	Code Subtotal				**0.59**		**$47,385**
LR13	**Cream Alley-KY 213 Project**						
	Conversion; 1P, 336 ACSR to 3P, 336 ACSR	Montgomery	Jeffersonville Ckt 1	5320	0.24	$80,313	$19,275
	Conversion; 1P, 336 ACSR to 3P, 336 ACSR	Montgomery	Jeffersonville Ckt 1	532	0.66	$80,313	$53,007
	Code Subtotal				**0.90**		**$72,282**
LR14	**McCormick Road Project - Part 2**						
	Conversion; 1P, 4 ACSR to 3P, 2 ACSR	Montgomery	Hope Ckt 3	4731	0.80	$64,050	$51,240
	Conversion; 1P, 4 ACSR to 3P, 2 ACSR	Montgomery	Hope Ckt 3	4732	0.11	$64,050	$7,046
	Code Subtotal				**0.91**		**$58,286**
LR15	**Grassy Lick Project - Part 2**						
	Reconductor; 3P, 6 ACWC to 3P, 336 ACSR	Montgomery	Sideview Ckt 3	2022	0.81	$80,313	$65,054
	Code Subtotal				**0.81**		**$65,054**
LR16	**Grassy Lick Project - Part 3**						
	Reconductor; 3P, 6 ACWC to 3P, 336 ACSR	Montgomery	Sideview Ckt 3	2023	1.11	$80,313	$89,147
	Reconductor; 3P, 6 ACWC to 3P, 336 ACSR	"	"	211	0.85	$80,313	$68,266
	Reconductor; 3P, 6 ACWC to 3P, 336 ACSR	Montgomery	Sideview Ckt 3	2111	0.74	$80,313	$59,432
	Code Subtotal				**2.70**		**$216,845**
LR17	**Grassy Lick Project - Part 4**						
	Reconductor; 3P, 4 ACSR to 3P, 336 ACSR	Montgomery	Reid Village Ckt 1	212	0.94	$80,313	$75,494
	Reconductor; 3P, 4 ACSR to 3P, 336 ACSR	Montgomery	Reid Village Ckt 1	2121	1.25	$80,313	$100,391
	Code Subtotal				**2.19**		**$175,885**
319	**Cat Creek Project**						
319.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Stanton Ckt 2	761	0.60	$80,313	$48,188
319.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	762	0.15	$80,313	$12,047
319.03	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Stanton Ckt 2	7622	0.91	$80,313	$73,085
	Code Subtotal				**1.66**		**$133,320**
320	**Furnace-KY 213 Project**						
320.01	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	Powell	Stanton Ckt 3	651	0.99	$80,313	$79,510
320.02	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	"	"	6510	0.89	$80,313	$71,479
320.03	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	643	0.94	$80,313	$75,494
320.04	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Stanton Ckt 3	6431	0.55	$80,313	$44,172
	Code Subtotal				**3.37**		**$270,655**
321	**Ewing Trail Project**						
321.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Stanton Ckt 4	615	0.63	$80,313	$50,597
321.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Stanton Ckt 4	6151	0.46	$80,313	$36,944
	Code Subtotal				**1.09**		**$87,541**
322	**Morris Creek Project - Part 1**						
322.01	Reconductor; 3P, 6 ACWC to 3P, 336 ACSR	Powell	Stanton Ckt 4	5643	0.32	$80,313	$25,700
322.02	Reconductor; 3P, 6 ACWC to 3P, 336 ACSR	Powell	Stanton Ckt 4	5645	0.37	$80,313	$29,716
	Code Subtotal				**0.69**		**$55,416**
323	**Virden Ridge - Lone Oak Project**						
323.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Clay City Ckt 1	565	0.26	$80,313	$20,881
323.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Clay City Ckt 1	5651	0.99	$80,313	$79,510
	Code Subtotal				**1.25**		**$100,391**
324	**Adams Br-KY 82 Project - Part 1**						
324.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Clay City Ckt 2	606	0.25	$80,313	$20,078
324.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	6062	0.67	$80,313	$53,810
324.03	Conversion; 1P, 2 ACSR to 3P, 336 ACSR	"	"	60621	0.32	$80,313	$25,700
324.04	Conversion; 1P, 336 ACSR to 3P, 336 ACSR	"	"	6072	0.08	$80,313	$6,425
324.05	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Clay City Ckt 2	6072	0.33	$80,313	$26,503
	Code Subtotal				**1.65**		**$132,516**
325	**Adams Br-KY 82 Project - Part 2**						
325.01	Reconductor; 3P, 6 ACWC to 336 ACSR	Powell	Clay City Ckt 2	6052	0.21	$80,313	$16,866
325.02	Reconductor; 3P, 6 ACWC to 336 ACSR	"	"	568	0.08	$80,313	$6,425
325.03	Reconductor; 3P, 6 ACWC to 336 ACSR	"	"	605	0.24	$80,313	$19,275
325.04	Reconductor; 3P, 6 ACWC to 336 ACSR	Powell	Clay City Ckt 2	6053	0.39	$80,313	$31,322
	Code Subtotal				**0.92**		**$73,888**

326	**Clay City - KY11 Project - Part 1**						
326.01	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	Powell	Clay City Ckt 4	525	0.52	$80,313	$41,763
326.02	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	Powell	Clay City Ckt 4	5252	1.10	$80,313	$88,344
	Code Subtotal				**1.62**		**$130,107**
327	**Hardwicks Creek**						
327.01	Voltage conversion; 3P, 1/0 ACSR	Powell	Hardwicks Ck Ckt 2	635	0.74	$12,767	$9,448
327.02	Voltage conversion; 3P, 1/0 ACSR	"	"	6361	0.19	$12,767	$2,426
327.03	Voltage conversion; 3P, 1/0 ACSR	"	"	6362	0.18	$12,767	$2,298
327.04	Voltage conversion; 3P, 1/0 ACSR	"	"	636	0.41	$12,767	$5,234
327.05	Voltage conversion; 3P, 1/0 ACSR	"	"	637	0.06	$12,767	$766
327.06	Voltage conversion; 3P, 1/0 ACSR	"	"	6372	0.80	$12,767	$10,214
327.07	Voltage conversion; 3P, 1/0 ACSR	"	"	6373	0.29	$12,767	$3,702
327.08	Voltage conversion; 1P, 4 ACSR	"	"	634	1.08	$7,637	$8,248
327.09	Voltage conversion; 1P, 4 ACSR	"	"	6341	0.77	$7,637	$5,880
327.10	Voltage conversion; 1P, 2 ACSR	"	"	6363	1.12	$7,637	$8,553
327.11	Voltage conversion; 1P, 1/0 ACSR	"	"	6371	0.53	$7,637	$4,048
327.12	Voltage conversion; 1P, 1/0 ACSR	"	"	640	1.27	$7,637	$9,699
327.13	Voltage conversion; 1P, 1/0 ACSR	"	"	6401	0.68	$7,637	$5,193
327.14	Voltage conversion; 1P, 4 ACSR	"	"	641	0.71	$7,637	$5,422
327.15	Voltage conversion; 1P, 4 ACSR	"	"	6411	0.29	$7,637	$2,215
327.16	Voltage conversion; 1P, 4 ACSR	"	"	6413	1.28	$7,637	$9,775
327.17	Voltage conversion; 1P, 4 ACSR	"	"	6414	1.22	$7,637	$9,317
327.18	Voltage conversion; 1P, 4 ACSR	"	"	6412	1.28	$7,637	$9,775
327.19	Voltage conversion; 1P, 4 ACSR	Powell	Hardwicks Ck Ckt 2	6342	1.99	$7,637	$15,198
	Code Subtotal				**14.89**		**$127,411**
328	**Frames Branch**						
328.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Hardwicks Ck Ckt 3	633	1.22	$80,313	$97,982
	Code Subtotal				**1.22**		**$97,982**
329	**Frames Branch-KY 82 Project**						
329.01	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	Powell	Hardwicks Ck Ckt 3	6331	0.29	$80,313	$23,291
329.02	Conversion; 1P, 4 ACSR to 3P, 336 ACSR	"	"	6335	0.44	$80,313	$35,338
329.03	Conversion; 1P, 336 ACSR to 3P, 336 ACSR	Powell	Hardwicks Ck Ckt 3	6335	0.11	$80,313	$8,834
	Code Subtotal				**0.84**		**$67,463**
330	**Clay City - KY 15 Project**						
330.01	Reconductor; 3P, 4/0 ACSR to 3P, 795 ACSR	Powell	Clay City Ckt 2	567	0.32	$99,716	$31,909
330.02	Reconductor; 3P, 4/0 ACSR to 3P, 795 ACSR	"	"	5671	0.51	$99,716	$50,855
330.03	Reconductor; 3P, 4/0 ACSR to 3P, 795 ACSR	Powell	Clay City Ckt 2	571	0.65	$99,716	$64,815
	Code Subtotal				**1.48**		**$147,579**
331	**Brush Creek Project**						
331.01	Conversion; 1P, 4 ACSR to 2P, 2 ACSR	Powell	Clay City Ckt 1	554	0.78	$32,566	$25,401
	Code Subtotal				**0.78**		**$25,401**
332	**Bowen School-Cat Creek Project**						
332.01	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	Powell	Bowen Ckt 3	763	0.76	$80,313	$61,038
332.02	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	Powell	Bowen Ckt 3	7631	1.03	$80,313	$82,722
	Code Subtotal				**1.79**		**$143,760**
333	**Morris Creek Project - Part 2**						
333.01	Reconductor; 3P, 397 ACSR to 3P, 795 ACSR	Powell	Stanton Ckt 4	619	0.06	$99,716	$5,983
333.02	Reconductor; 3P, 397 ACSR to 3P, 795 ACSR	"	"	6191	0.21	$99,716	$20,940
333.03	Reconductor; 3P, 397 ACSR to 3P, 795 ACSR	"	"	6193	0.14	$99,716	$13,960
333.04	Reconductor; 3P, 336 ACSR to 3P, 795 ACSR	"	"	612	0.16	$99,716	$15,955
333.05	Reconductor; 3P, 336 ACSR to 3P, 795 ACSR	"	"	6125	0.12	$99,716	$11,966
333.06	Reconductor; 3P, 336 ACSR to 3P, 795 ACSR	Powell	Stanton Ckt 4	6127	0.06	$99,716	$5,983
	Code Subtotal				**0.75**		**$74,787**
LR18	**Virden-West Bend Project**						
	Reconductor; 3P, 4/0 ACSR to 3P, 336 ACSR	Powell	Clay City Ckt 1	5604	0.32	$80,313	$25,700
	Reconductor; 3P, 4/0 ACSR to 3P, 336 ACSR	Powell	Clay City Ckt 1	560	0.51	$80,313	$40,960
	Code Subtotal				**0.83**		**$66,660**
LR19	**Clay City - KY11 Project - Part 2**						
	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	Powell	Clay City Ckt 4	5253	0.98	$80,313	$78,707
	Conversion; 1P, 6 ACWC to 3P, 336 ACSR	Powell	Clay City Ckt 4	5254	0.94	$80,313	$75,494
	Code Subtotal				**1.92**		**$154,201**

Code	Description	County	Circuit	Section	Miles	Cost/Mile	Total Cost
LR20	**Twin Knobs UD Project**						
	Replace UD; 3P, 1/0 w/ 3P, 1/0 AC	Rowan	Cave Run Ckt 1	1027	1.70	$165,870	$281,979
	Code Subtotal				**1.70**		**$281,979**
	Subtotal - Code 300's				**115.63 Miles**		**$6,545,426**

Code	Miscellaneous Distribution Equipment & Replacements			Total Cost
	Description	Quantity	Cost	
601	Underground Meters	2040	$129	$263,160
	Overhead Meters	4760	$129	$614,040
	Underground Transformers	2228	$837	$1,864,836
	Overhead Transformers	5200	$837	$4,352,400
	Total Transformers and Meters			$7,094,436
602	Service Entrance Changes	708	$973	$688,884
603	Three-Phase Reclosers - Electronic	26	$20,000	$520,000
	Single-Phase Reclosers - Hydraulic	240	$3,500	$840,000
	Single-Phase Reclosers - Electronic	24	$8,000	$192,000
	Air Break Switches	24	$5,000	$120,000
	Sectionalizing Activities, e.g. Cutouts, Switches, Arresters			$833,333
	Total Sectionalizing Equipment & Activities			$2,505,333
604	100 Amp Voltage Regulators	36	$8,500	$306,000
605	600 kVAR Switched Capacitor Banks, Appurtenances, & Controls	32	$2,500	$80,000
606	System Pole Replacements	2172	$997	$2,165,484
701	Security Light Installations	3036	$234	$710,424
	Subtotal - Misc. Dist. Equip. & Replacements			**$13,550,561**
1300	Headquarters Office Renovation & Expansion Project			$1,200,000
	Long Range Plan Total			**$33,589,075**

9 Appendix

The Appendix provides various support documentation to prepare the 2008 LRP, 2003-2005 CWP and substation evaluation. The Appendix Table of Contents below illustrates the appropriate page or tabbed section in which the listed support documentation is located. Facility maps of the distribution system used to illustrate by code all proposed system improvement projects are contained in protective sleeves inside the back cover of bound hard copies of this document. Each of these maps provides voltage level boxes to illustrate voltage levels before and after planned system improvements and/or new substations. The proposed office renovation and expansion floor plan is also included in a protective sleeve of bound hard copies of this document. Alternately, an electronic version of this document including all accompanying maps, drawings and/or load flow analysis is available as an Adobe™ portable document format (PDF) computer file. All Milsoft WindMil load flow analysis are available as a separate Adobe PDF file.

Appendix Table of Contents

Projected PRS Extreme 10% Case Winter Loads (MW)

Delivery Point/Year	2003	2004	2005	2006	2007	2008	2009
1 A.O. Smith	2.86	2.94	3.06	3.14	3.22	3.29	3.38
2 Blevins Valley	3.61	3.74	3.93	4.07	4.20	4.34	4.49
3 Bowen	5.01	5.11	5.29	5.39	5.49	5.59	5.71
4 Cave Run	2.13	2.19	2.29	2.35	2.41	2.47	2.55
5 Clay City	15.40	15.97	16.79	17.40	18.00	18.60	19.30
6 Frenchburg	11.30	11.74	12.37	12.85	13.32	13.79	14.34
7 High Rock	0.63	0.64	0.67	0.68	0.69	0.70	0.72
8 Hope	6.21	6.43	6.76	6.99	7.23	7.46	7.73
9 Hunt	15.13	15.44	15.97	16.29	16.58	16.85	17.21
10 Jeffersonville	7.22	7.54	7.98	8.33	8.69	9.04	9.44
11 Mariba	4.11	4.16	4.26	4.30	4.34	4.37	4.42
12 Mt. Sterling	6.18	6.34	6.58	6.74	6.89	7.03	7.21
13 Preston	1.82	1.82	1.85	1.85	1.85	1.84	1.84
14 Reid Village	4.18	4.28	4.44	4.55	4.65	4.75	4.87
15 Sideview	7.47	7.66	7.97	8.17	8.37	8.55	8.78
16 Stanton	12.58	12.71	13.01	13.13	13.23	13.31	13.46
17 Three Forks	7.67	7.95	8.34	8.63	8.92	9.20	9.53
18 Trapp	3.33	3.39	3.51	3.58	3.64	3.70	3.78
19 Treehaven	4.91	5.02	5.20	5.31	5.41	5.51	5.64
20 Union City	7.13	7.39	7.75	8.02	8.29	8.55	8.86
21 Van Meter	3.43	3.51	3.64	3.71	3.79	3.85	3.94
Totals	**132.31**	**135.98**	**141.66**	**145.49**	**149.22**	**152.79**	**157.18**

Delivery Point/Year	2010	2011	2012	2013	2014	2015	2016
1 A.O. Smith	3.50	3.59	3.67	3.76	3.86	3.95	4.03
2 Blevins Valley	4.69	4.85	5.00	5.18	5.35	5.52	5.69
3 Bowen	5.87	5.98	6.08	6.20	6.32	6.42	6.52
4 Cave Run	2.64	2.71	2.78	2.86	2.94	3.01	3.08
5 Clay City	20.16	20.87	21.54	22.34	23.10	23.88	24.61
6 Frenchburg	15.01	15.57	16.11	16.74	17.35	17.97	18.56
7 High Rock	0.74	0.75	0.77	0.78	0.80	0.81	0.82
8 Hope	8.07	8.34	8.60	8.90	9.20	9.50	9.78
9 Hunt	17.69	18.02	18.30	18.67	19.00	19.32	19.60
10 Jeffersonville	9.94	10.36	10.77	11.25	11.72	12.20	12.66
11 Mariba	4.50	4.54	4.57	4.62	4.66	4.69	4.71
12 Mt. Sterling	7.44	7.61	7.76	7.95	8.12	8.29	8.45
13 Preston	1.86	1.86	1.85	1.85	1.85	1.84	1.83
14 Reid Village	5.02	5.14	5.24	5.37	5.48	5.60	5.70
15 Sideview	9.07	9.29	9.49	9.73	9.96	10.18	10.39
16 Stanton	13.69	13.81	13.88	14.02	14.12	14.22	14.27
17 Three Forks	9.94	10.27	10.59	10.96	11.32	11.69	12.03
18 Trapp	3.89	3.96	4.02	4.10	4.18	4.25	4.31
19 Treehaven	5.80	5.92	6.02	6.15	6.27	6.39	6.49
20 Union City	9.24	9.55	9.84	10.19	10.53	10.86	11.18
21 Van Meter	4.06	4.14	4.21	4.30	4.39	4.47	4.54
Totals	**162.83**	**167.13**	**171.05**	**175.94**	**180.51**	**185.06**	**189.26**

Delivery Point/Year	2017	2018	2019	2020	2021	2022	% Load
1 A.O. Smith	4.12	4.21	4.34	4.43	4.54	4.65	104%
2 Blevins Valley	5.87	6.05	6.29	6.48	6.70	6.91	83%
3 Bowen	6.64	6.74	6.90	7.01	7.14	7.26	97%
4 Cave Run	3.17	3.24	3.35	3.42	3.52	3.61	121%
5 Clay City	25.46	26.26	27.32	28.16	29.15	30.13	166%
6 Frenchburg	19.24	19.89	20.74	21.43	22.23	23.02	127%
7 High Rock	0.84	0.85	0.87	0.88	0.90	0.91	66%
8 Hope	10.10	10.41	10.81	11.14	11.52	11.89	66%
9 Hunt	19.95	20.25	20.72	21.02	21.41	21.77	120%
10 Jeffersonville	13.19	13.71	14.36	14.91	15.55	16.18	89%
11 Mariba	4.75	4.78	4.85	4.87	4.91	4.95	59%
12 Mt. Sterling	8.63	8.79	9.04	9.21	9.42	9.61	53%
13 Preston	1.83	1.82	1.83	1.82	1.81	1.81	
14 Reid Village	5.83	5.94	6.10	6.22	6.36	6.49	78%
15 Sideview	10.63	10.84	11.16	11.39	11.66	11.92	143%
16 Stanton	14.38	14.45	14.64	14.70	14.82	14.92	48%
17 Three Forks	12.42	12.79	13.29	13.68	14.14	14.59	59%
18 Trapp	4.38	4.45	4.55	4.62	4.71	4.79	64%
19 Treehaven	6.61	6.72	6.89	7.00	7.14	7.27	87%
20 Union City	11.55	11.90	12.36	12.72	13.15	13.57	55%
21 Van Meter	4.63	4.70	4.82	4.90	5.00	5.09	61%
Totals	**194.21**	**198.79**	**205.23**	**210.01**	**215.78**	**221.33**	

Projected PRS Extreme 10% Case Summer Loads (MW)

Delivery Point/Year	2003	2004	2005	2006	2007	2008	2009
1 A.O. Smith	2.46	2.52	2.64	2.70	2.77	2.83	2.90
2 Blevins Valley	3.38	3.50	3.70	3.82	3.94	4.06	4.20
3 Bowen	5.48	5.59	5.82	5.93	6.03	6.12	6.24
4 Cave Run	1.31	1.35	1.42	1.46	1.49	1.53	1.57
5 Clay City	13.16	13.62	14.42	14.91	15.41	15.90	16.47
6 Frenchburg	9.25	9.60	10.18	10.55	10.92	11.29	11.73
7 High Rock	0.61	0.62	0.65	0.66	0.67	0.68	0.69
8 Hope	4.86	5.02	5.31	5.48	5.66	5.83	6.04
9 Hunt	9.34	9.51	9.90	10.08	10.24	10.40	10.60
10 Jeffersonville	5.37	5.60	5.97	6.22	6.47	6.72	7.02
11 Mariba	3.19	3.22	3.32	3.34	3.37	3.39	3.42
12 Mt. Sterling	5.47	5.60	5.85	5.98	6.11	6.22	6.37
13 Preston	1.91	1.91	1.95	1.94	1.94	1.93	1.93
14 Reid Village	4.20	4.29	4.49	4.59	4.68	4.77	4.88
15 Sideview	5.02	5.15	5.39	5.51	5.64	5.75	5.90
16 Stanton	16.42	16.56	17.07	17.19	17.30	17.38	17.54
17 Three Forks	4.18	4.32	4.57	4.72	4.87	5.01	5.19
18 Trapp	2.51	2.56	2.66	2.71	2.75	2.80	2.85
19 Treehaven	3.90	3.98	4.15	4.23	4.31	4.38	4.47
20 Union City	3.89	4.02	4.25	4.38	4.52	4.66	4.82
21 Van Meter	2.80	2.86	2.98	3.04	3.09	3.14	3.21
Totals	**108.70**	**111.38**	**116.68**	**119.43**	**122.17**	**124.79**	**128.03**

Delivery Point/Year	2010	2011	2012	2013	2014	2015	2016
1 A.O. Smith	3.02	3.09	3.16	3.24	3.31	3.39	3.45
2 Blevins Valley	4.42	4.56	4.69	4.86	5.01	5.17	5.32
3 Bowen	6.47	6.58	6.68	6.81	6.92	7.03	7.13
4 Cave Run	1.64	1.68	1.72	1.77	1.82	1.86	1.90
5 Clay City	17.33	17.92	18.47	19.13	19.77	20.41	21.02
6 Frenchburg	12.37	12.81	13.24	13.74	14.23	14.72	15.19
7 High Rock	0.72	0.73	0.74	0.75	0.77	0.78	0.79
8 Hope	6.34	6.55	6.74	6.98	7.20	7.42	7.64
9 Hunt	10.98	11.16	11.32	11.54	11.73	11.91	12.07
10 Jeffersonville	7.44	7.74	8.04	8.39	8.73	9.08	9.42
11 Mariba	3.51	3.53	3.55	3.58	3.61	3.63	3.64
12 Mt. Sterling	6.62	6.76	6.89	7.05	7.20	7.34	7.46
13 Preston	1.96	1.95	1.94	1.94	1.93	1.93	1.91
14 Reid Village	5.08	5.19	5.28	5.40	5.52	5.62	5.72
15 Sideview	6.14	6.28	6.40	6.56	6.71	6.85	6.98
16 Stanton	17.97	18.09	18.16	18.32	18.44	18.53	18.59
17 Three Forks	5.45	5.62	5.79	5.99	6.18	6.37	6.55
18 Trapp	2.95	3.00	3.04	3.10	3.15	3.20	3.24
19 Treehaven	4.63	4.72	4.80	4.90	4.99	5.07	5.14
20 Union City	5.07	5.23	5.38	5.57	5.74	5.92	6.09
21 Van Meter	3.33	3.39	3.44	3.52	3.58	3.64	3.70
Totals	**133.42**	**136.61**	**139.49**	**143.13**	**146.55**	**149.86**	**152.95**

Delivery Point/Year	2017	2018	2019	2020	2021	2022	% Load
1 A.O. Smith	3.53	3.61	3.74	3.81	3.90	3.99	151%
2 Blevins Valley	5.49	5.65	5.91	6.08	6.28	6.47	103%
3 Bowen	7.25	7.36	7.59	7.69	7.83	7.95	142%
4 Cave Run	1.95	2.00	2.07	2.12	2.18	2.23	126%
5 Clay City	21.72	22.41	23.45	24.15	24.97	25.77	189%
6 Frenchburg	15.73	16.26	17.05	17.61	18.24	18.87	139%
7 High Rock	0.80	0.82	0.84	0.85	0.87	0.88	84%
8 Hope	7.88	8.12	8.49	8.74	9.02	9.30	68%
9 Hunt	12.27	12.46	12.82	13.00	13.22	13.43	99%
10 Jeffersonville	9.80	10.18	10.73	11.14	11.60	12.06	89%
11 Mariba	3.67	3.69	3.76	3.78	3.81	3.83	61%
12 Mt. Sterling	7.62	7.77	8.03	8.17	8.35	8.51	62%
13 Preston	1.91	1.90	1.92	1.91	1.90	1.89	
14 Reid Village	5.84	5.95	6.16	6.26	6.40	6.52	104%
15 Sideview	7.13	7.28	7.53	7.68	7.85	8.02	128%
16 Stanton	18.71	18.80	19.15	19.21	19.35	19.45	81%
17 Three Forks	6.76	6.96	7.27	7.48	7.72	7.96	41%
18 Trapp	3.30	3.35	3.45	3.49	3.55	3.61	64%
19 Treehaven	5.24	5.33	5.49	5.57	5.68	5.78	92%
20 Union City	6.28	6.47	6.76	6.95	7.18	7.40	39%
21 Van Meter	3.76	3.83	3.94	4.00	4.08	4.15	66%
Totals	**156.65**	**160.19**	**166.17**	**169.70**	**173.97**	**178.06**	

Projected PRS Extreme 10% Case Winter Loads (MW)

Delivery Point/Year	2003	2004	2005	2006	2007	2008	2009
1 A.O. Smith/Hinks	2.86	2.94	3.06	3.14	3.22	3.29	3.38
2 Blevins Valley	3.61	3.74	3.93	4.07	4.20	4.34	4.49
3 Bowen	5.01	5.11	5.29	5.39	5.49	5.59	5.71
4 Cave Run	2.13	2.19	2.29	2.35	2.41	2.47	2.55
5 Clay City	15.40	12.47	13.15	13.63	14.10	14.52	15.08
6 Frenchburg	11.30	11.74	12.37	12.85	13.32	13.79	14.34
7 Hardwicks Creek		3.51	3.64	3.77	3.91	4.07	4.22
8 High Rock	0.63	0.64	0.67	0.68	0.69	0.70	0.72
9 Hope	6.21	6.43	6.76	6.99	7.23	7.46	7.73
10 Hunt	15.13	11.11	11.55	11.76	11.96	12.11	12.37
11 Jeffersonville	7.22	7.54	7.98	8.33	8.69	9.04	9.44
12 Mariba	4.11	4.16	4.26	4.30	4.34	4.37	4.42
13 Miller Hunt		5.48	5.60	5.73	5.85	6.00	6.13
14 Mt. Sterling	6.18	6.34	6.58	6.74	6.89	7.03	7.21
15 Preston	1.82	1.82	1.85	1.85	1.85	1.84	1.84
16 Reid Village	4.18	3.13	3.27	3.35	3.42	3.49	3.58
17 Sideview	7.47	7.66	7.97	8.17	8.37	8.55	8.78
18 Stanton	12.58	12.71	13.01	13.13	13.23	13.31	13.46
19 Three Forks	7.67	7.95	8.34	8.63	8.92	9.20	9.53
20 Trapp	3.33	3.39	3.51	3.58	3.64	3.70	3.78
21 Treehaven	4.91	5.02	5.20	5.31	5.41	5.51	5.64
22 Union City	7.13	7.39	7.75	8.02	8.29	8.55	8.86
23 Van Meter	3.43	3.51	3.64	3.71	3.79	3.85	3.94
Totals	**132.31**	**135.98**	**141.66**	**145.49**	**149.22**	**152.79**	**157.18**

Delivery Point/Year	2010	2011	2012	2013	2014	2015	2016
1 A.O. Smith/Hinks	3.50	3.59	3.67	3.76	3.86	3.95	4.03
2 Blevins Valley	4.69	4.85	5.00	5.18	5.35	5.52	5.69
3 Bowen	5.87	5.98	6.08	6.20	6.32	6.42	6.52
4 Cave Run	2.64	2.71	2.78	2.86	2.94	3.01	3.08
5 Clay City	15.79	16.33	16.83	17.46	18.05	18.64	19.19
6 Frenchburg	15.01	15.57	16.11	16.74	17.35	17.97	18.56
7 Hardwicks Creek	4.38	4.54	4.70	4.87	5.05	5.23	5.43
8 High Rock	0.74	0.75	0.77	0.78	0.80	0.81	0.82
9 Hope	8.07	8.34	8.60	8.90	9.20	9.50	9.78
10 Hunt	12.74	12.96	13.12	13.38	13.60	13.80	13.95
11 Jeffersonville	9.94	10.36	10.77	11.25	11.72	12.20	12.66
12 Mariba	4.50	4.54	4.57	4.62	4.66	4.69	4.71
13 Miller Hunt	6.27	6.41	6.55	6.69	6.84	7.00	7.15
14 Mt. Sterling	7.44	7.61	7.76	7.95	8.12	8.29	8.45
15 Preston	1.86	1.86	1.85	1.85	1.85	1.84	1.83
16 Reid Village	3.71	3.79	3.86	3.96	4.05	4.13	4.20
17 Sideview	9.07	9.29	9.49	9.73	9.96	10.18	10.39
18 Stanton	13.69	13.81	13.88	14.02	14.12	14.22	14.27
19 Three Forks	9.94	10.27	10.59	10.96	11.32	11.69	12.03
20 Trapp	3.89	3.96	4.02	4.10	4.18	4.25	4.31
21 Treehaven	5.80	5.92	6.02	6.15	6.27	6.39	6.49
22 Union City	9.24	9.55	9.84	10.19	10.53	10.86	11.18
23 Van Meter	4.06	4.14	4.21	4.30	4.39	4.47	4.54
Totals	**162.83**	**167.13**	**171.05**	**175.94**	**180.51**	**185.06**	**189.26**

Delivery Point/Year	2017	2018	2019	2020	2021	2022	% Load
1 A.O. Smith/Hinks	4.12	4.21	4.34	4.43	4.54	4.65	26%
2 Blevins Valley	5.87	6.05	6.29	6.48	6.70	6.91	83%
3 Bowen	6.64	6.74	6.90	7.01	7.14	7.26	97%
4 Cave Run	3.17	3.24	3.35	3.42	3.52	3.61	121%
5 Clay City	19.83	20.43	21.28	21.91	22.67	23.40	129%
6 Frenchburg	19.24	19.89	20.74	21.43	22.23	23.02	127%
7 Hardwicks Creek	5.62	5.82	6.04	6.26	6.49	6.73	81%
8 High Rock	0.84	0.85	0.87	0.88	0.90	0.91	66%
9 Hope	10.10	10.41	10.81	11.14	11.52	11.89	66%
10 Hunt	14.17	14.34	14.69	14.85	15.11	15.35	85%
11 Jeffersonville	13.19	13.71	14.36	14.91	15.55	16.18	89%
12 Mariba	4.75	4.78	4.85	4.87	4.91	4.95	59%
13 Miller Hunt	7.31	7.48	7.64	7.81	7.98	8.13	45%
14 Mt. Sterling	8.63	8.79	9.04	9.21	9.42	9.61	53%
15 Preston	1.83	1.82	1.83	1.82	1.81	1.81	
16 Reid Village	4.29	4.37	4.50	4.58	4.68	4.78	57%
17 Sideview	10.63	10.84	11.16	11.39	11.66	11.92	143%
18 Stanton	14.38	14.45	14.64	14.70	14.82	14.92	48%
19 Three Forks	12.42	12.79	13.29	13.68	14.14	14.59	59%
20 Trapp	4.38	4.45	4.55	4.62	4.71	4.79	64%
21 Treehaven	6.61	6.72	6.89	7.00	7.14	7.27	87%
22 Union City	11.55	11.90	12.36	12.72	13.15	13.57	55%
23 Van Meter	4.63	4.70	4.82	4.90	5.00	5.09	61%
Totals	**194.21**	**198.79**	**205.23**	**210.01**	**215.78**	**221.33**	

Projected PRS Extreme 10% Case Summer Loads (MW)

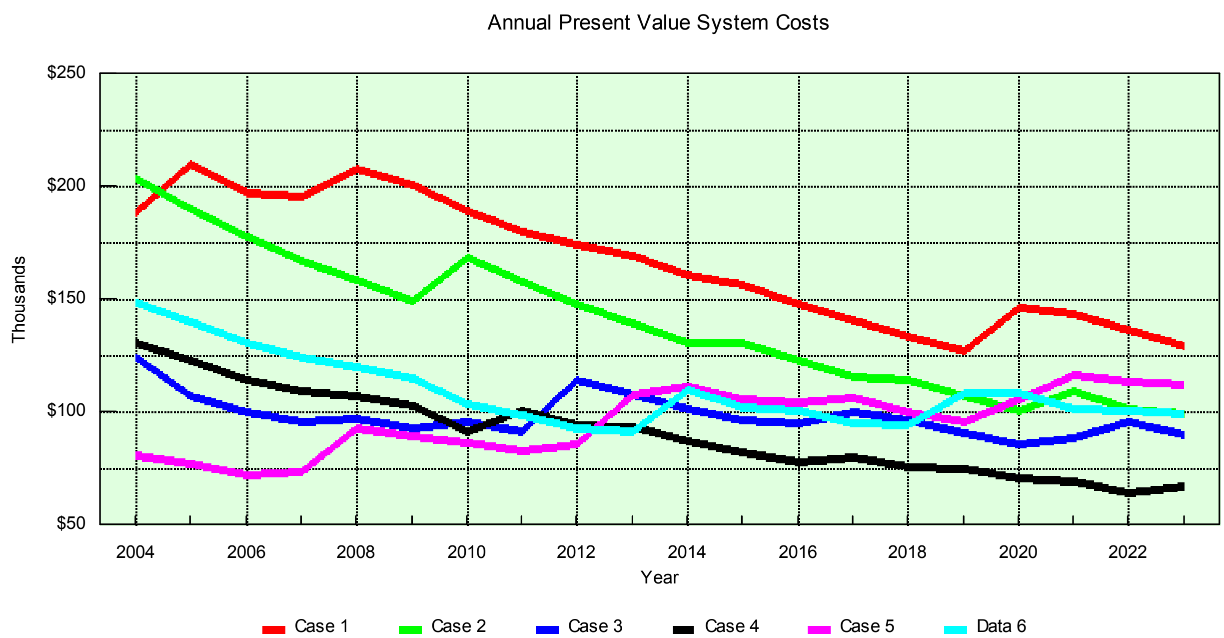
Delivery Point/Year	2003	2004	2005	2006	2007	2008	2009
1 A.O. Smith/Hinks	2.46	2.52	2.64	2.70	2.77	2.83	2.90
2 Blevins Valley	3.38	3.50	3.70	3.82	3.94	4.06	4.20
3 Bowen	5.48	5.59	5.82	5.93	6.03	6.12	6.24
4 Cave Run	1.31	1.35	1.42	1.46	1.49	1.53	1.57
5 Clay City	13.16	11.12	11.83	12.22	12.62	12.99	13.46
6 Frenchburg	9.25	9.60	10.18	10.55	10.92	11.29	11.73
7 Hardwicks Creek		2.50	2.60	2.69	2.79	2.91	3.01
8 High Rock	0.61	0.62	0.65	0.66	0.67	0.68	0.69
9 Hope	4.86	5.02	5.31	5.48	5.66	5.83	6.04
10 Hunt	9.34	6.43	6.76	6.86	6.96	7.03	7.16
11 Jeffersonville	5.37	5.60	5.97	6.22	6.47	6.72	7.02
12 Mariba	3.19	3.22	3.32	3.34	3.37	3.39	3.42
13 Miller Hunt		3.90	3.98	4.07	4.16	4.26	4.36
14 Mt. Sterling	5.47	5.60	5.85	5.98	6.11	6.22	6.37
15 Preston	1.91	1.91	1.95	1.94	1.94	1.93	1.93
16 Reid Village	4.20	3.47	3.65	3.73	3.81	3.88	3.97
17 Sideview	5.02	5.15	5.39	5.51	5.64	5.75	5.90
18 Stanton	16.42	16.56	17.07	17.19	17.30	17.38	17.54
19 Three Forks	4.18	4.32	4.57	4.72	4.87	5.01	5.19
20 Trapp	2.51	2.56	2.66	2.71	2.75	2.80	2.85
21 Treehaven	3.90	3.98	4.15	4.23	4.31	4.38	4.47
22 Union City	3.89	4.02	4.25	4.38	4.52	4.66	4.82
23 Van Meter	2.80	2.86	2.98	3.04	3.09	3.14	3.21
Totals	**108.70**	**111.38**	**116.68**	**119.43**	**122.17**	**124.79**	**128.03**

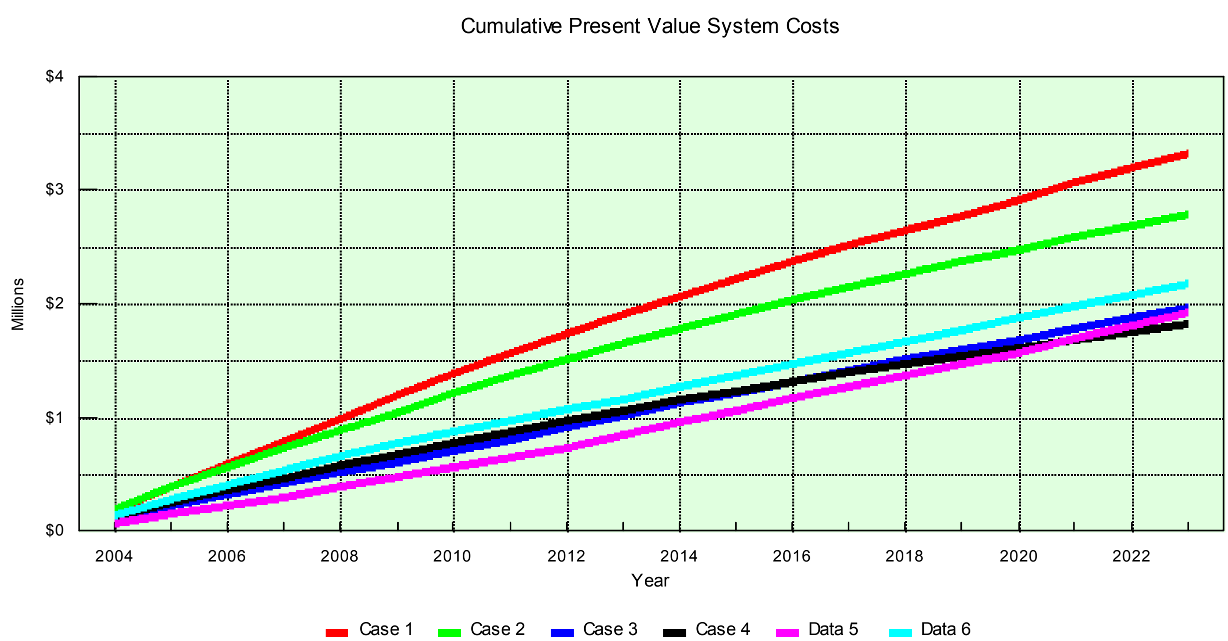
Delivery Point/Year	2010	2011	2012	2013	2014	2015	2016
1 A.O. Smith/Hinks	3.02	3.09	3.16	3.24	3.31	3.39	3.45
2 Blevins Valley	4.42	4.56	4.69	4.86	5.01	5.17	5.32
3 Bowen	6.47	6.58	6.68	6.81	6.92	7.03	7.13
4 Cave Run	1.64	1.68	1.72	1.77	1.82	1.86	1.90
5 Clay City	14.21	14.68	15.12	15.66	16.17	16.67	17.15
6 Frenchburg	12.37	12.81	13.24	13.74	14.23	14.72	15.19
7 Hardwicks Creek	3.12	3.24	3.36	3.48	3.61	3.73	3.87
8 High Rock	0.72	0.73	0.74	0.75	0.77	0.78	0.79
9 Hope	6.34	6.55	6.74	6.98	7.20	7.42	7.64
10 Hunt	7.46	7.57	7.65	7.78	7.89	7.99	8.06
11 Jeffersonville	7.44	7.74	8.04	8.39	8.73	9.08	9.42
12 Mariba	3.51	3.53	3.55	3.58	3.61	3.63	3.64
13 Miller Hunt	4.45	4.55	4.65	4.76	4.86	4.97	5.08
14 Mt. Sterling	6.62	6.76	6.89	7.05	7.20	7.34	7.46
15 Preston	1.96	1.95	1.94	1.94	1.93	1.93	1.91
16 Reid Village	4.14	4.23	4.30	4.40	4.50	4.58	4.66
17 Sideview	6.14	6.28	6.40	6.56	6.71	6.85	6.98
18 Stanton	17.97	18.09	18.16	18.32	18.44	18.53	18.59
19 Three Forks	5.45	5.62	5.79	5.99	6.18	6.37	6.55
20 Trapp	2.95	3.00	3.04	3.10	3.15	3.20	3.24
21 Treehaven	4.63	4.72	4.80	4.90	4.99	5.07	5.14
22 Union City	5.07	5.23	5.38	5.57	5.74	5.92	6.09
23 Van Meter	3.33	3.39	3.44	3.52	3.58	3.64	3.70
Totals	**133.42**	**136.61**	**139.49**	**143.13**	**146.55**	**149.86**	**152.95**

Delivery Point/Year	2017	2018	2019	2020	2021	2022	% Load
1 A.O. Smith/Hinks	3.53	3.61	3.74	3.81	3.90	3.99	29%
2 Blevins Valley	5.49	5.65	5.91	6.08	6.28	6.47	103%
3 Bowen	7.25	7.36	7.59	7.69	7.83	7.95	142%
4 Cave Run	1.95	2.00	2.07	2.12	2.18	2.23	126%
5 Clay City	17.71	18.25	19.14	19.69	20.34	20.98	154%
6 Frenchburg	15.73	16.26	17.05	17.61	18.24	18.87	139%
7 Hardwicks Creek	4.01	4.16	4.31	4.47	4.63	4.80	77%
8 High Rock	0.80	0.82	0.84	0.85	0.87	0.88	84%
9 Hope	7.88	8.12	8.49	8.74	9.02	9.30	68%
10 Hunt	8.17	8.26	8.54	8.61	8.76	8.86	65%
11 Jeffersonville	9.80	10.18	10.73	11.14	11.60	12.06	89%
12 Mariba	3.67	3.69	3.76	3.78	3.81	3.83	61%
13 Miller Hunt	5.19	5.31	5.43	5.55	5.65	5.78	42%
14 Mt. Sterling	7.62	7.77	8.03	8.17	8.35	8.51	62%
15 Preston	1.91	1.90	1.92	1.91	1.90	1.89	
16 Reid Village	4.75	4.84	5.02	5.10	5.21	5.31	85%
17 Sideview	7.13	7.28	7.53	7.68	7.85	8.02	128%
18 Stanton	18.71	18.80	19.15	19.21	19.35	19.45	81%
19 Three Forks	6.76	6.96	7.27	7.48	7.72	7.96	41%
20 Trapp	3.30	3.35	3.45	3.49	3.55	3.61	64%
21 Treehaven	5.24	5.33	5.49	5.57	5.68	5.78	92%
22 Union City	6.28	6.47	6.76	6.95	7.18	7.40	39%
23 Van Meter	3.76	3.83	3.94	4.00	4.08	4.15	66%
Totals	**156.65**	**160.19**	**166.17**	**169.70**	**173.97**	**178.06**	

2004-2023 Cumulative Present Value Evaluation Summary					
Case Description	**Distribution PV Facility Cost**	**G&T PV Facility Cost**	**Reliability Value PV Cost**	**Distribution PV Loss Cost**	**Total PV Cost**
Case 1 - Plan w/o Hardwicks Ck Sub	$2,025,026	$487,172	$355,807	$464,720	$3,332,725
Case 2 - Plan w/ Hardwicks Ck Sub	$787,410	$1,730,828	$119,813	$155,926	$2,793,977
Case 3 - Plan w/o Miller Hunt Sub	$1,170,906	$254,526	$212,614	$331,173	$1,969,219
Case 4 - Plan w/ Miller Hunt Sub	$544,330	$895,928	$97,629	$284,804	$1,822,691
Case 5 - Plan w/o Olympia Springs Sub	$1,181,480	$231,684	$160,862	$349,119	$1,923,145
Case 6 - Plan w/ Olympia Springs Sub	$379,055	$1,477,547	$91,100	$241,440	$2,189,142

Notes: Loss costs only reflect distribution feeder losses valued at avoided costs.
All evaluation categories reflect total present value costs in 2004 dollars.





Case 1 - System Improvements w/o Hardwicks Creek Sub
Losses Evaluated at Avoided Cost

Item Description and Costs		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Current Transmission Costs		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Projected Transmission Costs @	2.43%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cumulative Transmission Costs		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Transmission System Cost Rate @	12.52%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual Transmission Costs		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Current Substation Costs		$0	$370,343	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$370,343	$0	$0	$0
Projected Substation Costs @	2.43%	$0	$379,331	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$543,544	$0	$0	$0
Cumulative Substation Costs		$0	$379,331	$379,331	$379,331	$379,331	$379,331	$379,331	$379,331	$379,331	$379,331	$379,331	$379,331	$379,331	$379,331	$379,331	$379,331	$922,875	$922,875	$922,875	$922,875
Substation System Cost Rate @	10.90%	$0	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$100,593	$100,593	$100,593	$100,593
Annual Substation Costs		$0	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$100,593	$100,593	$100,593	$100,593
Monthly Delivery Point Costs @	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual Delivery Point Costs		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Current Distribution Costs		$789,855	$0	$0	$43,040	$171,196	$0	$93,236	$0	$43,305	$47,195	$0	$73,465	$0	$0	$0	$0	$78,457	$61,741	$0	$0
Projected Distribution Costs @	2.33%	$789,855	$0	$0	$46,121	$187,725	$0	$107,060	$0	$52,071	$58,071	$0	$94,659	$0	$0	$0	$0	$113,435	$91,347	$0	$0
Cumulative Distribution Costs		$789,855	$789,855	$789,855	$835,976	$1,023,701	$1,023,701	$1,130,760	$1,130,760	$1,182,831	$1,240,902	$1,240,902	$1,335,561	$1,335,561	$1,335,561	$1,335,561	$1,335,561	$1,448,996	$1,540,343	$1,540,343	$1,540,343
Distribution System Cost Rate @	16.58%	$130,958	$130,958	$130,958	$138,605	$169,730	$169,730	$187,480	$187,480	$196,113	$205,742	$205,742	$221,436	$221,436	$221,436	$221,436	$221,436	$240,244	$255,389	$255,389	$255,389
Annual Distribution Costs		$130,958	$130,958	$130,958	$138,605	$169,730	$169,730	$187,480	$187,480	$196,113	$205,742	$205,742	$221,436	$221,436	$221,436	$221,436	$221,436	$240,244	$255,389	$255,389	$255,389
Projected Dist. Losses (kW)		354	291	314	339	277	300	275	296	303	310	334	304	328	354	382	412	441	474	513	554
Projected Loss Costs Rate @	2.13%	$101.86	$103.64	$96.55	$107.39	$136.50	$153.63	$112.25	$119.78	$119.36	$122.75	$125.98	$128.83	$131.93	$134.28	$137.12	$140.76	$143.90	$146.21	$149.06	$151.92
Annual Distribution Loss Costs		$36,057	$30,160	$30,318	$36,406	$37,810	$46,089	$30,870	$35,455	$36,165	$38,052	$42,079	$39,165	$43,272	$47,535	$52,381	$57,993	$63,458	$69,302	$76,469	$84,163
Projected Residential Customers		2229	2286	2344	2404	2465	2528	2592	2658	2726	2795	2866	2939	3014	3091	3170	3251	3334	3419	3506	3595
Projected Customer-Hrs Outage @ SAIDI=	1.96	4369	4481	4594	4712	4831	4955	5080	5210	5343	5478	5617	5760	5907	6058	6213	6372	6535	6701	6872	7046
Projected Customer Reliability Value @	2.33%	$4.99	$5.11	$5.23	$5.35	$5.47	$5.60	$5.73	$5.86	$6.00	$6.14	$6.28	$6.43	$6.58	$6.73	$6.89	$7.05	$7.21	$7.38	$7.55	$7.73
Annual Customer Reliabilty Value		$21,801	$22,896	$24,028	$25,208	$26,428	$27,747	$29,110	$30,529	$32,058	$33,636	$35,277	$37,040	$38,871	$40,773	$42,809	$44,922	$47,115	$49,455	$51,882	$54,467
Annual Transmission Costs		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual Substation Costs		$0	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$41,347	$100,593	$100,593	$100,593	$100,593
Annual Delivery Point Costs		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual Distribution Costs		$130,958	$130,958	$130,958	$138,605	$169,730	$169,730	$187,480	$187,480	$196,113	$205,742	$205,742	$221,436	$221,436	$221,436	$221,436	$221,436	$240,244	$255,389	$255,389	$255,389
Annual Distribution Loss Costs		$36,057	$30,160	$30,318	$36,406	$37,810	$46,089	$30,870	$35,455	$36,165	$38,052	$42,079	$39,165	$43,272	$47,535	$52,381	$57,993	$63,458	$69,302	$76,469	$84,163
Annual Residential Reliability Value		$21,801	$22,896	$24,028	$25,208	$26,428	$27,747	$29,110	$30,529	$32,058	$33,636	$35,277	$37,040	$38,871	$40,773	$42,809	$44,922	$47,115	$49,455	$51,882	$54,467
Annual System Costs		$188,816	$225,361	$226,650	$241,566	$275,315	$284,913	$288,807	$294,811	$305,683	$318,777	$324,444	$338,988	$344,926	$351,091	$357,973	$365,699	$451,410	$474,739	$484,333	$494,613
PW Annual Total System Costs @	7.30%	$188,816	$210,029	$196,860	$195,540	$207,697	$200,315	$189,239	$180,030	$173,970	$169,079	$160,377	$156,166	$148,091	$140,483	$133,492	$127,095	$146,209	$143,305	$136,254	$129,679
Cumulative PW System Costs	$3,332,725	$188,816	$398,845	$595,704	$791,245	$998,942	$1,199,257	$1,388,495	$1,568,526	$1,742,495	$1,911,574	$2,071,951	$2,228,117	$2,376,209	$2,516,691	$2,650,183	$2,777,278	$2,923,487	$3,066,792	$3,203,046	$3,332,725

Case 2 - System Improvements w/ Hardwicks Creek Sub
Losses Evaluated at Avoided Cost

Item Description and Costs		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Current Transmission Costs		$643,059	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Projected Transmission Costs @	2.43%	$643,059	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cumulative Transmission Costs		$643,059	$643,059	$643,059	$643,059	$643,059	$643,059	$643,059	$643,059	$643,059	$643,059	$643,059	$643,059	$643,059	$643,059	$643,059	$643,059	$643,059	$643,059	$643,059	$643,059
Transmission System Cost Rate @	12.52%	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511
Annual Transmission Costs		$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511
Current Substation Costs		$458,469	$0	$0	$0	$0	$0	$370,343	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Projected Substation Costs @	2.43%	$458,469	$0	$0	$0	$0	$0	$427,652	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cumulative Substation Costs		$458,469	$458,469	$458,469	$458,469	$458,469	$458,469	$886,121	$886,121	$886,121	$886,121	$886,121	$886,121	$886,121	$886,121	$886,121	$886,121	$886,121	$886,121	$886,121	$886,121
Substation System Cost Rate @	10.90%	$49,973	$49,973	$49,973	$49,973	$49,973	$49,973	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587
Annual Substation Costs		$49,973	$49,973	$49,973	$49,973	$49,973	$49,973	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587
Monthly Delivery Point Costs @	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual Delivery Point Costs		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Current Distribution Costs		$355,346	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$86,200	$0	$0	$68,477	$0	$0	$197,235	$0	$58,510
Projected Distribution Costs @	2.33%	$355,346	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$111,067	$0	$0	$94,546	$0	$0	$291,815	$0	$90,650
Cumulative Distribution Costs		$355,346	$355,346	$355,346	$355,346	$355,346	$355,346	$355,346	$355,346	$355,346	$355,346	$355,346	$466,413	$466,413	$466,413	$560,959	$560,959	$560,959	$852,774	$852,774	$943,424
Distribution System Cost Rate @	16.58%	$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$77,331	$77,331	$77,331	$93,007	$93,007	$93,007	$141,390	$141,390	$156,420
Annual Distribution Costs		$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$77,331	$77,331	$77,331	$93,007	$93,007	$93,007	$141,390	$141,390	$156,420
Projected Dist. Losses (kW) @		63	67	73	78	85	91	98	105	113	122	131	134	144	154	159	171	184	195	175	188
Projected Loss Costs Rate @	2.13%	$101.86	$103.64	$96.55	$107.39	$136.50	$153.63	$112.25	$119.78	$119.36	$122.75	$125.98	$128.83	$131.93	$134.28	$137.12	$140.76	$143.90	$146.21	$149.06	$151.92
Annual Distribution Loss Costs		$6,417	$6,944	$7,048	$8,377	$11,602	$13,980	$11,001	$12,577	$13,487	$14,975	$16,504	$17,264	$18,997	$20,679	$21,803	$24,070	$26,477	$28,510	$26,086	$28,561
Projected Residential Customers		2229	2286	2344	2404	2465	2528	2592	2658	2726	2795	2866	2939	3014	3091	3170	3251	3334	3419	3506	3595
Projected Customer-Hrs Outage @ SAIDI=	0.66	1471	1509	1547	1587	1627	1668	1711	1754	1799	1845	1892	1940	1989	2040	2092	2146	2200	2257	2314	2373
Projected Customer Reliability Value @	2.33%	$4.99	$5.11	$5.23	$5.35	$5.47	$5.60	$5.73	$5.86	$6.00	$6.14	$6.28	$6.43	$6.58	$6.73	$6.89	$7.05	$7.21	$7.38	$7.55	$7.73
Annual Customer Reliabilty Value		$7,341	$7,710	$8,091	$8,489	$8,899	$9,343	$9,802	$10,280	$10,795	$11,326	$11,879	$12,473	$13,089	$13,730	$14,415	$15,127	$15,865	$16,653	$17,470	$18,341
Annual Transmission Costs		$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511	$80,511
Annual Substation Costs		$49,973	$49,973	$49,973	$49,973	$49,973	$49,973	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587	$96,587
Annual Delivery Point Costs		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual Distribution Costs		$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$58,916	$77,331	$77,331	$77,331	$93,007	$93,007	$93,007	$141,390	$141,390	$156,420
Annual Distribution Loss Costs		$6,417	$6,944	$7,048	$8,377	$11,602	$13,980	$11,001	$12,577	$13,487	$14,975	$16,504	$17,264	$18,997	$20,679	$21,803	$24,070	$26,477	$28,510	$26,086	$28,561
Annual Residential Reliability Value		$7,341	$7,710	$8,091	$8,489	$8,899	$9,343	$9,802	$10,280	$10,795	$11,326	$11,879	$12,473	$13,089	$13,730	$14,415	$15,127	$15,865	$16,653	$17,470	$18,341
Annual System Costs		$203,159	$204,054	$204,540	$206,266	$209,902	$212,724	$256,818	$258,872	$260,297	$262,316	$264,397	$284,166	$286,516	$288,838	$306,323	$309,302	$312,447	$363,652	$362,045	$380,420
PW Annual Total System Costs @	7.30%	$203,159	$190,172	$177,655	$166,966	$158,350	$149,561	$168,278	$158,083	$148,139	$139,132	$130,695	$130,911	$123,013	$115,574	$114,231	$107,495	$101,200	$109,772	$101,851	$99,740
Cumulative PW System Costs	$2,793,977	$203,159	$393,330	$570,986	$737,952	$896,302	$1,045,863	$1,214,140	$1,372,224	$1,520,363	$1,659,495	$1,790,191	$1,921,101	$2,044,115	$2,159,688	$2,273,919	$2,381,414	$2,482,614	$2,592,386	$2,694,237	$2,793,977

Case 3 - System Improvements w/o Miller Hunt Sub
Losses Evaluated at Avoided Cost

Item Description and Costs		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Current Transmission Costs		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Projected Transmission Costs @	2.43%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cumulative Transmission Costs		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Transmission System Cost Rate @	12.52%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual Transmission Costs		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Current Substation Costs		$0	$0	$0	$0	$0	$0	$0	$0	$370,343	$0	$0	$0	$0	$0	$0	$0	$0	$152,124	$0	$0
Projected Substation Costs @	2.43%	$0	$0	$0	$0	$0	$0	$0	$0	$448,662	$0	$0	$0	$0	$0	$0	$0	$0	$228,688	$0	$0
Cumulative Substation Costs		$0	$0	$0	$0	$0	$0	$0	$0	$448,662	$448,662	$448,662	$448,662	$448,662	$448,662	$448,662	$448,662	$448,662	$677,350	$677,350	$677,350
Substation System Cost Rate @	10.90%	$0	$0	$0	$0	$0	$0	$0	$0	$48,904	$48,904	$48,904	$48,904	$48,904	$48,904	$48,904	$48,904	$48,904	$73,831	$73,831	$73,831
Annual Substation Costs		$0	$0	$0	$0	$0	$0	$0	$0	$48,904	$48,904	$48,904	$48,904	$48,904	$48,904	$48,904	$48,904	$48,904	$73,831	$73,831	$73,831
Monthly Delivery Point Costs @	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual Delivery Point Costs		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Current Distribution Costs		$488,571	$0	$0	$0	$0	$0	$126,736	$0	$0	$0	$0	$0	$44,963	$122,340	$27,821	$0	$0	$0	$176,050	$0
Projected Distribution Costs @	2.33%	$488,571	$0	$0	$0	$0	$0	$145,527	$0	$0	$0	$0	$0	$59,285	$165,068	$38,412	$0	$0	$0	$266,542	$0
Cumulative Distribution Costs		$488,571	$488,571	$488,571	$488,571	$488,571	$488,571	$634,098	$634,098	$634,098	$634,098	$634,098	$634,098	$693,383	$858,451	$896,863	$896,863	$896,863	$896,863	$1,163,404	$1,163,404
Distribution System Cost Rate @	16.58%	$81,005	$81,005	$81,005	$81,005	$81,005	$81,005	$105,133	$105,133	$105,133	$105,133	$105,133	$105,133	$114,963	$142,331	$148,700	$148,700	$148,700	$148,700	$192,892	$192,892
Annual Distribution Costs		$81,005	$81,005	$81,005	$81,005	$81,005	$81,005	$105,133	$105,133	$105,133	$105,133	$105,133	$105,133	$114,963	$142,331	$148,700	$148,700	$148,700	$148,700	$192,892	$192,892
Projected Dist. Losses (kW) @		285	185	193	201	234	220	211	220	229	237	248	259	270	262	270	281	294	307	301	315
Projected Loss Costs Rate @	2.13%	$101.86	$103.64	$96.55	$107.39	$136.50	$153.63	$112.25	$119.78	$119.36	$122.75	$125.98	$128.83	$131.93	$134.28	$137.12	$140.76	$143.90	$146.21	$149.06	$151.92
Annual Distribution Loss Costs		$29,029	$19,174	$18,635	$21,586	$31,941	$33,798	$23,685	$26,352	$27,332	$29,091	$31,244	$33,368	$35,620	$35,182	$37,023	$39,554	$42,305	$44,885	$44,868	$47,855
Projected Residential Customers		1451	1473	1496	1519	1542	1566	1590	1614	1639	1664	1689	1715	1741	1768	1795	1822	1850	1878	1907	1936
Projected Customer-Hrs Outage @ SAIDI=	1.96	2844	2887	2932	2977	3022	3069	3116	3163	3212	3261	3310	3361	3412	3465	3518	3571	3626	3681	3738	3795
Projected Customer Reliability Value @	2.33%	$4.99	$5.11	$5.23	$5.35	$5.47	$5.60	$5.73	$5.86	$6.00	$6.14	$6.28	$6.43	$6.58	$6.73	$6.89	$7.05	$7.21	$7.38	$7.55	$7.73
Annual Customer Reliabilty Value		$14,191	$14,753	$15,335	$15,928	$16,532	$17,188	$17,857	$18,538	$19,275	$20,025	$20,790	$21,614	$22,453	$23,321	$24,240	$25,176	$26,143	$27,165	$28,220	$29,332
Annual Transmission Costs		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual Substation Costs		$0	$0	$0	$0	$0	$0	$0	$0	$48,904	$48,904	$48,904	$48,904	$48,904	$48,904	$48,904	$48,904	$48,904	$73,831	$73,831	$73,831
Annual Delivery Point Costs		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual Distribution Costs		$81,005	$81,005	$81,005	$81,005	$81,005	$81,005	$105,133	$105,133	$105,133	$105,133	$105,133	$105,133	$114,963	$142,331	$148,700	$148,700	$148,700	$148,700	$192,892	$192,892
Annual Distribution Loss Costs		$29,029	$19,174	$18,635	$21,586	$31,941	$33,798	$23,685	$26,352	$27,332	$29,091	$31,244	$33,368	$35,620	$35,182	$37,023	$39,554	$42,305	$44,885	$44,868	$47,855
Annual Residential Reliability Value		$14,191	$14,753	$15,335	$15,928	$16,532	$17,188	$17,857	$18,538	$19,275	$20,025	$20,790	$21,614	$22,453	$23,321	$24,240	$25,176	$26,143	$27,165	$28,220	$29,332
Annual System Costs		$124,226	$114,932	$114,975	$118,519	$129,478	$131,992	$146,676	$150,023	$200,645	$203,154	$206,071	$209,019	$221,940	$249,738	$258,868	$262,334	$266,053	$294,581	$339,811	$343,910
PW Annual Total System Costs @	7.30%	$124,226	$107,113	$99,863	$95,938	$97,678	$92,800	$96,108	$91,613	$114,190	$107,753	$101,864	$96,292	$95,288	$99,928	$96,534	$91,171	$86,173	$88,922	$95,597	$90,168
Cumulative PW System Costs	$1,969,219	$124,226	$231,338	$331,201	$427,139	$524,817	$617,617	$713,725	$805,339	$919,529	$1,027,282	$1,129,146	$1,225,437	$1,320,726	$1,420,654	$1,517,188	$1,608,360	$1,694,533	$1,783,455	$1,879,052	$1,969,219

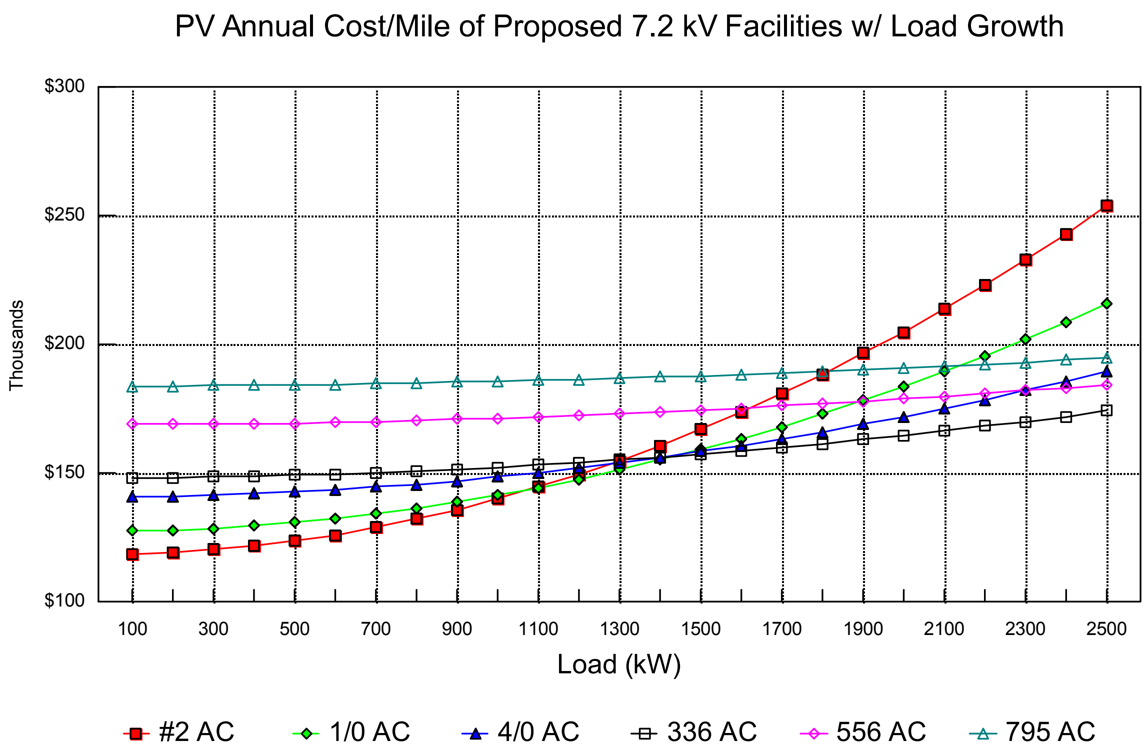
Case 4 - System Improvements w/ Miller Hunt Sub
Losses Evaluated at Avoided Cost

Item Description and Costs		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Current Transmission Costs		$172,055	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Projected Transmission Costs @	2.43%	$172,055	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cumulative Transmission Costs		$172,055	$172,055	$172,055	$172,055	$172,055	$172,055	$172,055	$172,055	$172,055	$172,055	$172,055	$172,055	$172,055	$172,055	$172,055	$172,055	$172,055	$172,055	$172,055	$172,055
Transmission System Cost Rate @	12.52%	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541
Annual Transmission Costs		$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541
Current Substation Costs		$542,400	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Projected Substation Costs @	2.43%	$542,400	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cumulative Substation Costs		$542,400	$542,400	$542,400	$542,400	$542,400	$542,400	$542,400	$542,400	$542,400	$542,400	$542,400	$542,400	$542,400	$542,400	$542,400	$542,400	$542,400	$542,400	$542,400	$542,400
Substation System Cost Rate @	10.90%	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122
Annual Substation Costs		$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122
Monthly Delivery Point Costs @	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual Delivery Point Costs		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Current Distribution Costs		$166,923	$0	$0	$0	$0	$0	$0	$126,736	$0	$39,898	$0	$0	$0	$76,526	$0	$45,814	$0	$38,656	$0	$93,075
Projected Distribution Costs @	2.33%	$166,923	$0	$0	$0	$0	$0	$0	$148,920	$0	$49,093	$0	$0	$0	$103,252	$0	$64,731	$0	$57,192	$0	$144,201
Cumulative Distribution Costs		$166,923	$166,923	$166,923	$166,923	$166,923	$166,923	$166,923	$315,843	$315,843	$364,935	$364,935	$364,935	$364,935	$468,188	$468,188	$532,918	$532,918	$590,110	$590,110	$734,312
Distribution System Cost Rate @	16.58%	$27,676	$27,676	$27,676	$27,676	$27,676	$27,676	$27,676	$52,367	$52,367	$60,506	$60,506	$60,506	$60,506	$77,626	$77,626	$88,358	$88,358	$97,840	$97,840	$121,749
Annual Distribution Costs		$27,676	$27,676	$27,676	$27,676	$27,676	$27,676	$27,676	$52,367	$52,367	$60,506	$60,506	$60,506	$60,506	$77,626	$77,626	$88,358	$88,358	$97,840	$97,840	$121,749
Projected Dist. Losses (kW) @		158	165	173	181	195	199	208	197	206	215	210	220	230	236	247	255	266	274	261	273
Projected Loss Costs Rate @	2.13%	$101.86	$103.64	$96.55	$107.39	$136.50	$153.63	$112.25	$119.78	$119.36	$122.75	$125.98	$128.83	$131.93	$134.28	$137.12	$140.76	$143.90	$146.21	$149.06	$151.92
Annual Distribution Loss Costs		$16,093	$17,101	$16,704	$19,438	$26,617	$30,572	$23,349	$23,597	$24,587	$26,391	$26,457	$28,343	$30,343	$31,690	$33,869	$35,894	$38,276	$40,061	$38,905	$41,474
Projected Residential Customers		1451	1473	1496	1519	1542	1566	1590	1614	1639	1664	1689	1715	1741	1768	1795	1822	1850	1878	1907	1936
Projected Customer-Hrs Outage @ SAIDI=	0.9	1306	1326	1346	1367	1388	1409	1431	1453	1475	1498	1520	1544	1567	1591	1616	1640	1665	1690	1716	1742
Projected Customer Reliability Value @	2.33%	$4.99	$5.11	$5.23	$5.35	$5.47	$5.60	$5.73	$5.86	$6.00	$6.14	$6.28	$6.43	$6.58	$6.73	$6.89	$7.05	$7.21	$7.38	$7.55	$7.73
Annual Customer Reliabilty Value		$6,516	$6,774	$7,042	$7,314	$7,591	$7,893	$8,200	$8,512	$8,851	$9,195	$9,546	$9,925	$10,310	$10,709	$11,131	$11,561	$12,005	$12,474	$12,958	$13,469
Annual Transmission Costs		$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541	$21,541
Annual Substation Costs		$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122	$59,122
Annual Delivery Point Costs		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual Distribution Costs		$27,676	$27,676	$27,676	$27,676	$27,676	$27,676	$27,676	$52,367	$52,367	$60,506	$60,506	$60,506	$60,506	$77,626	$77,626	$88,358	$88,358	$97,840	$97,840	$121,749
Annual Distribution Loss Costs		$16,093	$17,101	$16,704	$19,438	$26,617	$30,572	$23,349	$23,597	$24,587	$26,391	$26,457	$28,343	$30,343	$31,690	$33,869	$35,894	$38,276	$40,061	$38,905	$41,474
Annual Residential Reliability Value		$6,516	$6,774	$7,042	$7,314	$7,591	$7,893	$8,200	$8,512	$8,851	$9,195	$9,546	$9,925	$10,310	$10,709	$11,131	$11,561	$12,005	$12,474	$12,958	$13,469
Annual System Costs		$130,949	$132,214	$132,084	$135,091	$142,547	$146,804	$139,887	$165,138	$166,467	$176,755	$177,172	$179,437	$181,822	$200,687	$203,289	$216,475	$219,302	$231,038	$230,367	$257,354
PW Annual Total System Costs @	7.30%	$130,949	$123,219	$114,723	$109,352	$107,538	$103,214	$91,660	$100,844	$94,740	$93,751	$87,579	$82,664	$78,064	$80,302	$75,808	$75,234	$71,031	$69,741	$64,807	$67,474
Cumulative PW System Costs	$1,822,691	$130,949	$254,168	$368,891	$478,243	$585,780	$688,994	$780,654	$881,498	$976,238	$1,069,988	$1,157,567	$1,240,231	$1,318,295	$1,398,596	$1,474,404	$1,549,638	$1,620,669	$1,690,410	$1,755,217	$1,822,691

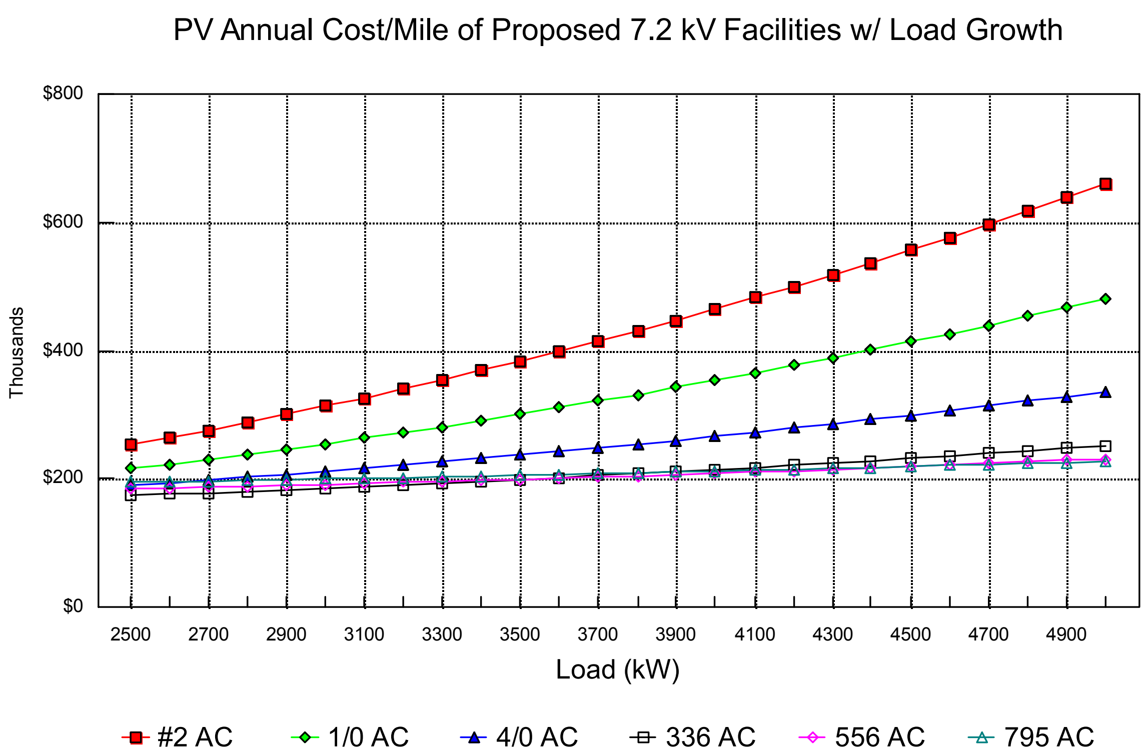
Present Value Total Annual Cost of Distribution Facilities

	Proposed Facilities							Existing Facilities				
kW	1-2 AC	2 AC	1/0 AC	4/0 AC	336 AC	556 AC	795 AC	1-2 AC	2 AC	1/0 AC	4/0 AC	336 AC
100	60623	118168	127111	140434	147942	168614	183650	651	217	142	79	41
200	62574	118819	127536	140670	148067	168688	183702	2602	867	567	314	166
300	65827	119903	128244	141062	148274	168813	183790	5855	1952	1275	707	373
400	70382	121421	129236	141612	148564	168987	183912	10410	3470	2267	1256	664
500	76237	123373	130511	142318	148937	169211	184070	16265	5422	3541	1963	1037
600	83394	125759	132069	143182	149394	169485	184263	23422	7807	5100	2826	1493
700	91852	128578	133911	144202	149933	169808	184490	31880	10627	6941	3847	2032
800	101611	131831	136036	145380	150555	170182	184753	41639	13880	9066	5024	2654
900	112671	135518	138444	146714	151260	170605	185051	52699	17566	11474	6359	3359
1000	125033	139638	141135	148206	152048	171078	185383	65061	21687	14166	7850	4147
1100	138695	144193	144110	149854	152918	171601	185751	78723	26241	17140	9499	5018
1200	153659	149181	147368	151660	153872	172173	186154	93687	31229	20399	11304	5972
1300	169925	154602	150910	153622	154909	172796	186591	109953	36651	23940	13267	7008
1400	187491	160458	154734	155742	156029	173468	187064	127519	42506	27765	15386	8128
1500	206359	166747	158842	158018	157231	174190	187572	146387	48796	31873	17663	9331
1600	226527	173470	163234	160452	158517	174961	188114	166555	55518	36264	20096	10616
1700	247997	180627	167908	163042	159885	175783	188692	188025	62675	40939	22687	11985
1800	270769	188217	172866	165790	161337	176654	189305	210797	70266	45897	25434	13436
1900	294841	196241	178108	168694	162871	177575	189953	234869	78290	51138	28339	14970
2000	320215	204699	183632	171756	164488	178546	190636	260243	86748	56663	31400	16588
2100	346890	213591	189440	174974	166189	179566	191354	286918	95639	62471	34619	18288
2200	374866	222916	195531	178350	167972	180637	192106	314894	104965	68562	37994	20071
2300	404143	232675	201906	181882	169838	181757	192894	344171	114724	74936	41527	21937
2400	434722	242868	208564	185572	171787	182927	193717	374750	124917	81594	45216	23886
2500	466601	253495	215505	189418	173819	184147	194575	406629	135543	88535	49063	25918
2600	499782	264555	222729	193422	175934	185416	195468	439810	146603	95760	53066	28033
2700	534265	276049	230237	197583	178132	186735	196396	474292	158097	103268	57227	30231
2800	570048	287977	238028	201900	180413	188105	197359	510076	170025	111059	61544	32512
2900	607132	300338	246103	206375	182777	189523	198357	547160	182387	119133	66019	34876
3000	645518	313134	254461	211006	185223	190992	199390	585546	195182	127491	70650	37323
3100	685205	326363	263102	215795	187753	192511	200458	625233	208411	136132	75439	39852
3200	726194	340025	272026	220740	190365	194079	201561	666222	222074	145056	80384	42465
3300	768483	354122	281234	225843	193061	195697	202699	708511	236170	154264	85487	45160
3400	812074	368652	290725	231102	195839	197365	203872	752102	250701	163755	90746	47939
3500	856966	383616	300499	236519	198701	199082	205080	796994	265665	173529	96163	50800
3600	903159	399014	310557	242092	201645	200850	206323	843187	281062	183587	101736	53744
3700	950653	414845	320898	247823	204672	202667	207601	890681	296894	193928	107467	56772
3800	999448	431110	331522	253710	207783	204534	208915	939476	313159	204552	113354	59882
3900	1049545	447809	342429	259755	210976	206450	210263	989573	329858	215460	119399	63075
4000	1100943	464942	353620	265956	214252	208417	211646	1040971	346990	226651	125600	66351
4100	1153642	482508	365094	272315	217611	210433	213064	1093670	364557	238125	131959	69710
4200	1207643	500508	376852	278830	221053	212499	214517	1147671	382557	249882	138474	73152
4300	1262944	518942	388893	285503	224578	214615	216005	1202972	400991	261923	145147	76677
4400	1319547	537810	401217	292332	228186	216781	217529	1259575	419858	274247	151977	80285
4500	1377451	557111	413824	299319	231876	218996	219087	1317479	439160	286855	158963	83976
4600	1436656	576846	426715	306462	235650	221262	220680	1376684	458895	299746	166107	87749
4700	1497163	597015	439889	313763	239507	223577	222308	1437191	479064	312920	173407	91606
4800	1558970	617618	453347	321220	243446	225941	223972	1498998	499666	326377	180865	95546
4900	1622079	638654	467087	328835	247469	228356	225670	1562107	520702	340118	188479	99568
5000	1686489	660124	481111	336607	251574	230820	227403	1626517	542172	354142	196251	103674

Notes: 7.2 kV operation is assumed for both proposed and existing distribution facilities.
2.740% per year load growth is assumed for both proposed and existing distribution facilities.
2.130% per year escalation in loss costs is assumed.



PV Annual Cost/Mile of Proposed 7.2 kV Facilities w/ Load Growth
$300
$250
$200
$150
$100
Thousands
100
300
500
700
900
1100
1300
1500
1700
1900
2100
2300
2500
Load (kW)
#2 AC
1/0 AC
4/0 AC
336 AC
556 AC
795 AC

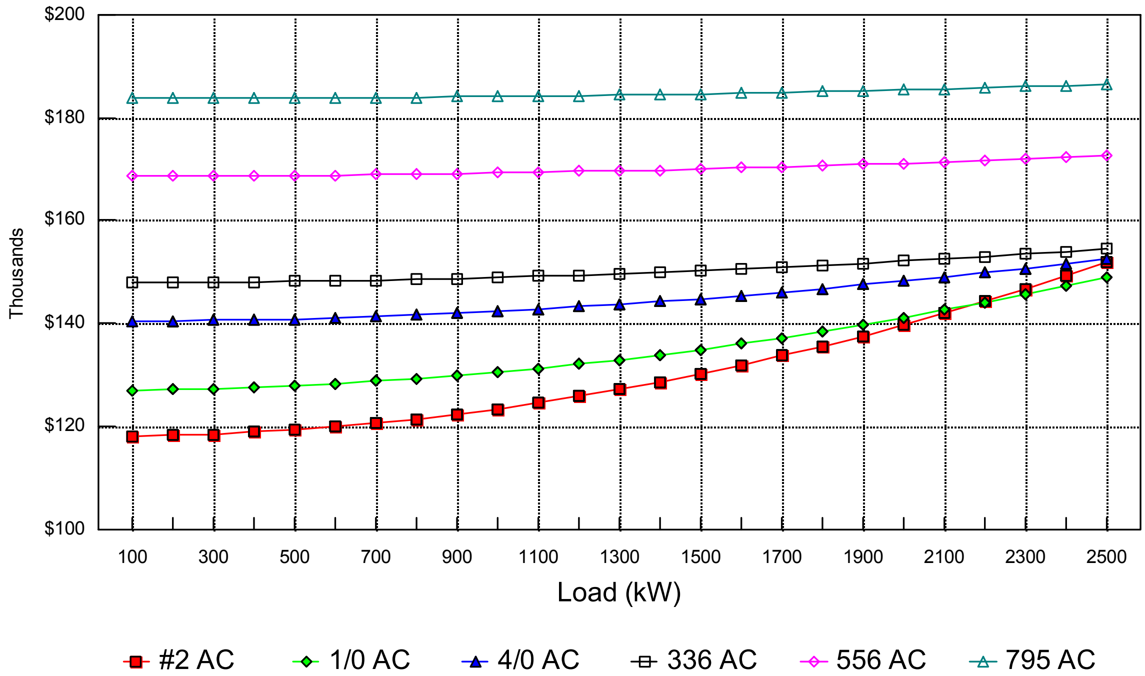


PV Annual Cost/Mile of Proposed 7.2 kV Facilities w/ Load Growth
$800
$600
$400
$200
$0
Thousands
2500
2700
2900
3100
3300
3500
3700
3900
4100
4300
4500
4700
4900
Load (kW)
#2 AC
1/0 AC
4/0 AC
336 AC
556 AC
795 AC

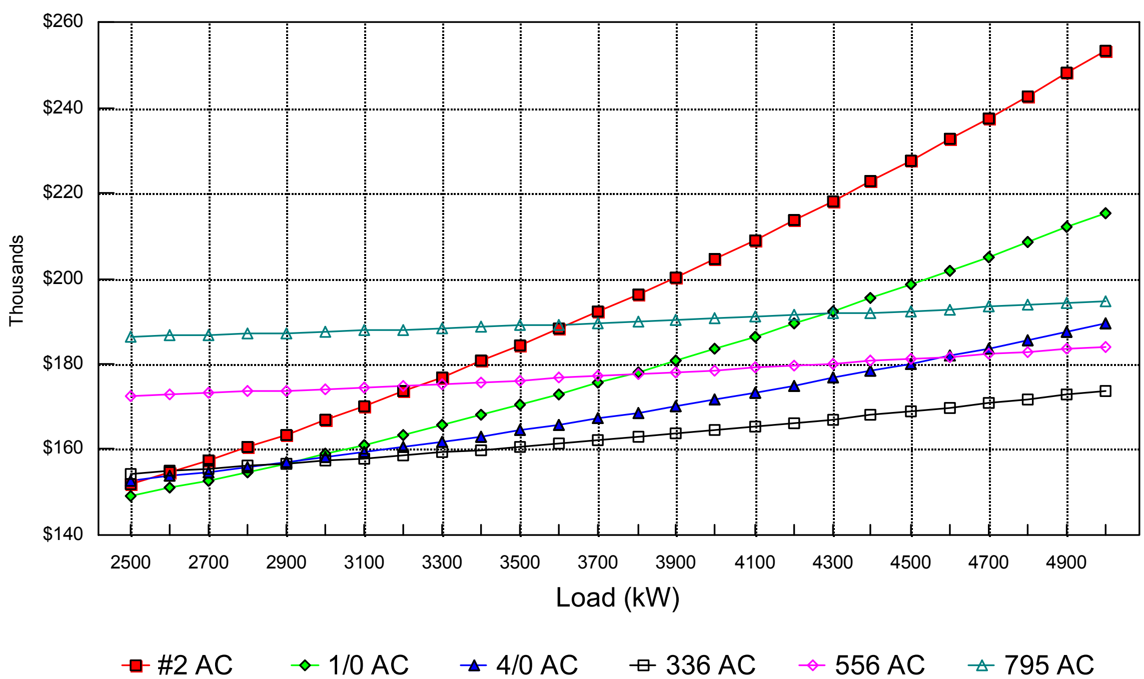
Present Value Total Annual Cost of Distribution Facilities													
	Proposed Facilities							Existing Facilities					
kW	1-2 AC	2 AC	1/0 AC	4/0 AC	336 AC	556 AC	795 AC	1-2 AC	2 AC	1/0 AC	4/0 AC	336 AC
100	60135	118006	127005	140375	147911	168595	183637	163	54	35	20	10
200	60623	118168	127111	140434	147942	168614	183650	651	217	142	79	41
300	61436	118439	127288	140532	147994	168645	183672	1464	488	319	177	93
400	62574	118819	127536	140670	148067	168688	183702	2602	867	567	314	166
500	64038	119307	127855	140846	148160	168744	183742	4066	1355	885	491	259
600	65827	119903	128244	141062	148274	168813	183790	5855	1952	1275	707	373
700	67942	120608	128705	141317	148409	168894	183847	7970	2657	1735	962	508
800	70382	121421	129236	141612	148564	168987	183912	10410	3470	2267	1256	664
900	73147	122343	129838	141945	148740	169093	183987	13175	4392	2869	1590	840
1000	76237	123373	130511	142318	148937	169211	184070	16265	5422	3541	1963	1037
1100	79653	124512	131255	142730	149155	169342	184162	19681	6560	4285	2375	1254
1200	83394	125759	132069	143182	149394	169485	184263	23422	7807	5100	2826	1493
1300	87460	127114	132955	143672	149653	169640	184372	27488	9163	5985	3317	1752
1400	91852	128578	133911	144202	149933	169808	184490	31880	10627	6941	3847	2032
1500	96569	130150	134938	144771	150233	169989	184617	36597	12199	7968	4416	2333
1600	101611	131831	136036	145380	150555	170182	184753	41639	13880	9066	5024	2654
1700	106978	133620	137204	146027	150897	170387	184897	47006	15669	10235	5672	2996
1800	112671	135518	138444	146714	151260	170605	185051	52699	17566	11474	6359	3359
1900	118689	137524	139754	147440	151643	170835	185212	58717	19572	12785	7085	3743
2000	125033	139638	141135	148206	152048	171078	185383	65061	21687	14166	7850	4147
2100	131701	141861	142587	149010	152473	171333	185563	71729	23910	15618	8655	4572
2200	138695	144193	144110	149854	152918	171601	185751	78723	26241	17140	9499	5018
2300	146015	146632	145704	150737	153385	171881	185948	86043	28681	18734	10382	5484
2400	153659	149181	147368	151660	153872	172173	186154	93687	31229	20399	11304	5972
2500	161629	151837	149103	152621	154380	172478	186368	101657	33886	22134	12266	6480
2600	169925	154602	150910	153622	154909	172796	186591	109953	36651	23940	13267	7008
2700	178545	157476	152786	154662	155458	173125	186823	118573	39524	25817	14307	7558
2800	187491	160458	154734	155742	156029	173468	187064	127519	42506	27765	15386	8128
2900	196762	163548	156753	156861	156620	173822	187313	136790	45597	29783	16505	8719
3000	206359	166747	158842	158018	157231	174190	187572	146387	48796	31873	17663	9331
3100	216280	170054	161003	159216	157864	174569	187839	156308	52103	34033	18860	9963
3200	226527	173470	163234	160452	158517	174961	188114	166555	55518	36264	20096	10616
3300	237100	176994	165536	161728	159191	175366	188399	177128	59043	38566	21372	11290
3400	247997	180627	167908	163042	159885	175783	188692	188025	62675	40939	22687	11985
3500	259220	184368	170352	164397	160601	176212	188994	199248	66416	43382	24041	12700
3600	270769	188217	172866	165790	161337	176654	189305	210797	70266	45897	25434	13436
3700	282642	192175	175452	167223	162094	177108	189625	222670	74223	48482	26867	14193
3800	294841	196241	178108	168694	162871	177575	189953	234869	78290	51138	28339	14970
3900	307365	200416	180835	170206	163669	178054	190290	247393	82464	53865	29850	15769
4000	320215	204699	183632	171756	164488	178546	190636	260243	86748	56663	31400	16588
4100	333390	209091	186501	173346	165328	179050	190990	273418	91139	59531	32990	17428
4200	346890	213591	189440	174974	166189	179566	191354	286918	95639	62471	34619	18288
4300	360715	218199	192450	176643	167070	180095	191726	300743	100248	65481	36287	19169
4400	374866	222916	195531	178350	167972	180637	192106	314894	104965	68562	37994	20071
4500	389342	227741	198683	180097	168895	181191	192496	329370	109790	71714	39741	20994
4600	404143	232675	201906	181882	169838	181757	192894	344171	114724	74936	41527	21937
4700	419270	237717	205199	183708	170802	182336	193301	359298	119766	78230	43352	22902
4800	434722	242868	208564	185572	171787	182927	193717	374750	124917	81594	45216	23886
4900	450499	248127	211999	187476	172793	183530	194142	390527	130176	85029	47120	24892
5000	466601	253495	215505	189418	173819	184147	194575	406629	135543	88535	49063	25918

Notes: 14.4 kV operation is assumed for both proposed and existing distribution facilities.
2.740% per year load growth is assumed for both proposed and existing distribution facilities.
2.130% per year escalation in loss costs is assumed.

PV Annual Cost/Mile of Proposed 14.4 kV Facilities w/ Load Growth



PV Annual Cost/Mile of Proposed 14.4 kV Facilities w/ Load Growth

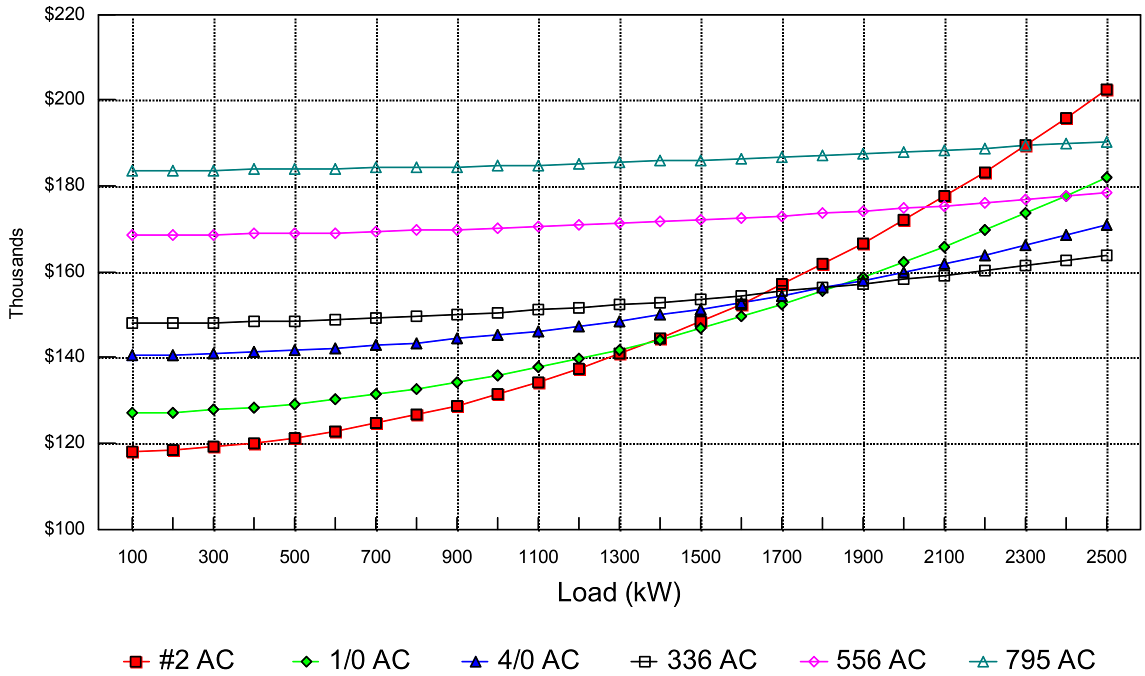


Present Value Total Annual Cost of Distribution Facilities

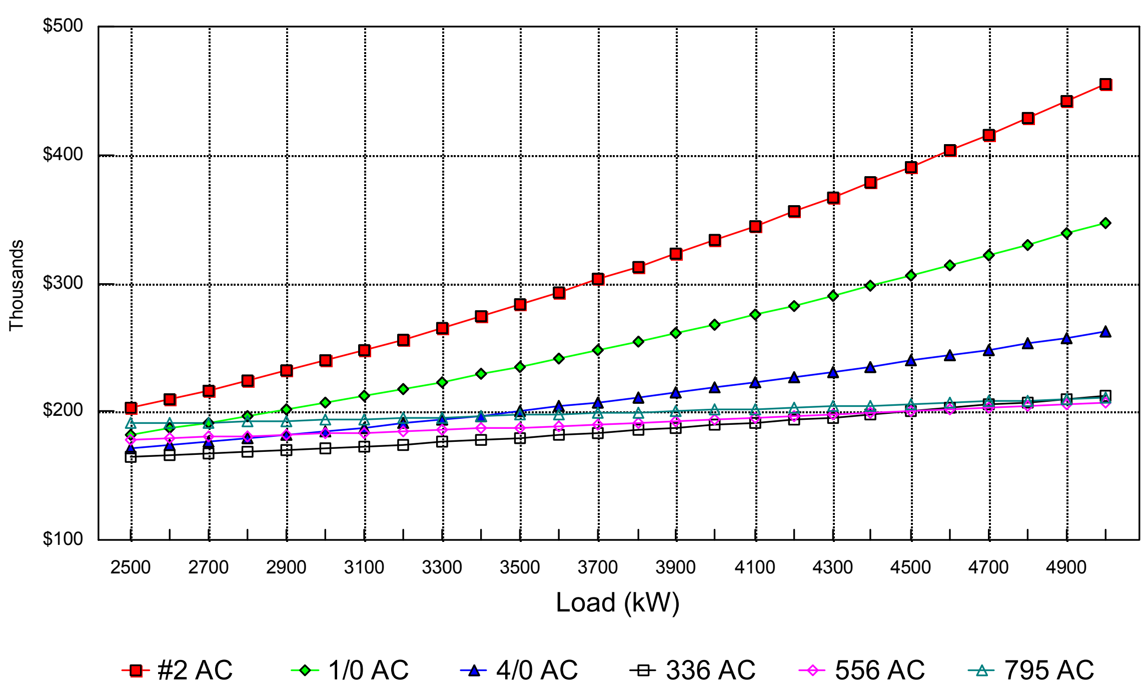
	Proposed Facilities							Existing Facilities				
kW	1-2 AC	2 AC	1/0 AC	4/0 AC	336 AC	556 AC	795 AC	1-2 AC	2 AC	1/0 AC	4/0 AC	336 AC
100	60377	118087	127058	140405	147926	168604	183643	405	135	88	49	26
200	61592	118492	127322	140551	148004	168651	183676	1620	540	353	196	103
300	63618	119167	127763	140796	148133	168728	183730	3646	1215	794	440	232
400	66454	120112	128381	141138	148314	168837	183807	6482	2161	1411	782	413
500	70100	121327	129175	141578	148546	168976	183905	10128	3376	2205	1222	646
600	74556	122813	130145	142115	148830	169147	184025	14584	4861	3175	1760	930
700	79822	124568	131292	142751	149166	169348	184167	19850	6617	4322	2395	1265
800	85899	126594	132615	143484	149553	169581	184330	25927	8642	5645	3128	1653
900	92786	128889	134114	144315	149992	169844	184515	32814	10938	7145	3959	2092
1000	100483	131455	135790	145244	150483	170139	184723	40511	13504	8820	4888	2582
1100	108991	134291	137642	146270	151025	170464	184951	49018	16339	10673	5914	3124
1200	118308	137397	139671	147394	151619	170821	185202	58336	19445	12702	7039	3718
1300	128436	140773	141876	148616	152265	171208	185475	68464	22821	14907	8261	4364
1400	139374	144419	144258	149936	152962	171627	185769	79402	26467	17288	9580	5061
1500	151122	148335	146816	151354	153711	172076	186085	91150	30383	19846	10998	5810
1600	163681	152521	149550	152869	154511	172557	186423	103709	34570	22580	12513	6610
1700	177049	156977	152461	154482	155363	173068	186783	117077	39026	25491	14126	7462
1800	191228	161704	155548	156193	156267	173611	187165	131256	43752	28578	15837	8366
1900	206217	166700	158812	158001	157222	174184	187568	146245	48748	31842	17646	9322
2000	222017	171966	162252	159908	158229	174789	187993	162045	54015	35282	19552	10329
2100	238626	177503	165868	161912	159288	175424	188440	178654	59551	38898	21556	11387
2200	256046	183309	169661	164014	160398	176091	188909	196074	65358	42691	23658	12498
2300	274276	189386	173630	166213	161560	176788	189399	214304	71435	46660	25857	13660
2400	293316	195733	177776	168510	162774	177517	189912	233344	77781	50806	28155	14873
2500	313167	202350	182098	170906	164039	178276	190446	253195	84398	55128	30550	16139
2600	333827	209237	186596	173398	165356	179067	191002	273855	91285	59627	33043	17455
2700	355298	216394	191271	175989	166725	179888	191580	295326	98442	64301	35633	18824
2800	377579	223821	196122	178677	168145	180741	192179	317607	105869	69153	38322	20244
2900	400671	231518	201150	181464	169617	181624	192801	340699	113566	74180	41108	21716
3000	424572	239485	206354	184347	171140	182539	193444	364600	121533	79384	43992	23240
3100	449284	247722	211735	187329	172715	183484	194109	389312	129771	84765	46973	24815
3200	474806	256230	217291	190408	174342	184461	194796	414834	138278	90322	50053	26441
3300	501138	265007	223025	193586	176020	185468	195505	441166	147055	96055	53230	28120
3400	528281	274054	228934	196861	177751	186506	196235	468309	156103	101965	56505	29850
3500	556234	283372	235021	200233	179532	187576	196987	496262	165421	108051	59877	31632
3600	584997	292960	241283	203704	181366	188676	197761	525025	175008	114314	63348	33465
3700	614570	302817	247722	207272	183251	189808	198557	554598	184866	120753	66916	35350
3800	644953	312945	254338	210938	185187	190970	199375	584981	194994	127368	70582	37287
3900	676147	323343	261129	214702	187175	192164	200214	616175	205392	134160	74346	39275
4000	708150	334011	268097	218563	189215	193388	201075	648178	216059	141128	78207	41315
4100	740965	344949	275242	222522	191307	194644	201958	680992	226997	148273	82166	43406
4200	774589	356157	282563	226579	193450	195930	202863	714617	238206	155594	86223	45549
4300	809023	367635	290061	230734	195645	197248	203790	749051	249684	163091	90378	47744
4400	844268	379383	297734	234987	197891	198596	204738	784296	261432	170765	94631	49991
4500	880323	391402	305585	239337	200190	199976	205709	820351	273450	178615	98981	52289
4600	917188	403690	313611	243785	202539	201386	206701	857216	285739	186642	103429	54639
4700	954863	416249	321814	248331	204941	202828	207715	894891	298297	194845	107975	57040
4800	993349	429077	330194	252974	207394	204300	208750	933377	311126	203224	112618	59493
4900	1032645	442176	338750	257716	209899	205804	209808	972673	324224	211780	117360	61998
5000	1072751	455544	347482	262555	212455	207338	210887	1012779	337593	220512	122199	64554

Notes:
7.2 kV operation is assumed for both proposed and existing distribution facilities.
0.000% per year load growth is assumed for both proposed and existing distribution facilities.
2.130% per year escalation in loss costs is assumed.

PV Annual Cost/Mile of Proposed 7.2 kV Facilities w/o Load Growth



PV Annual Cost/Mile of Proposed 7.2 kV Facilities w/o Load Growth

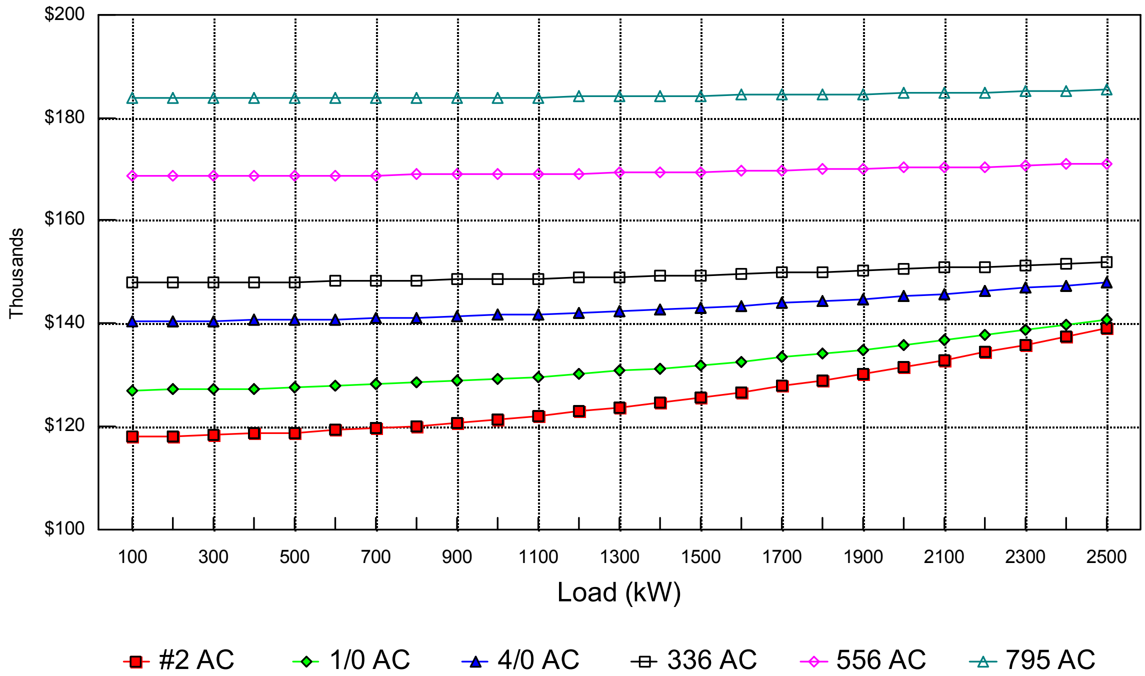


Present Value Total Annual Cost of Distribution Facilities

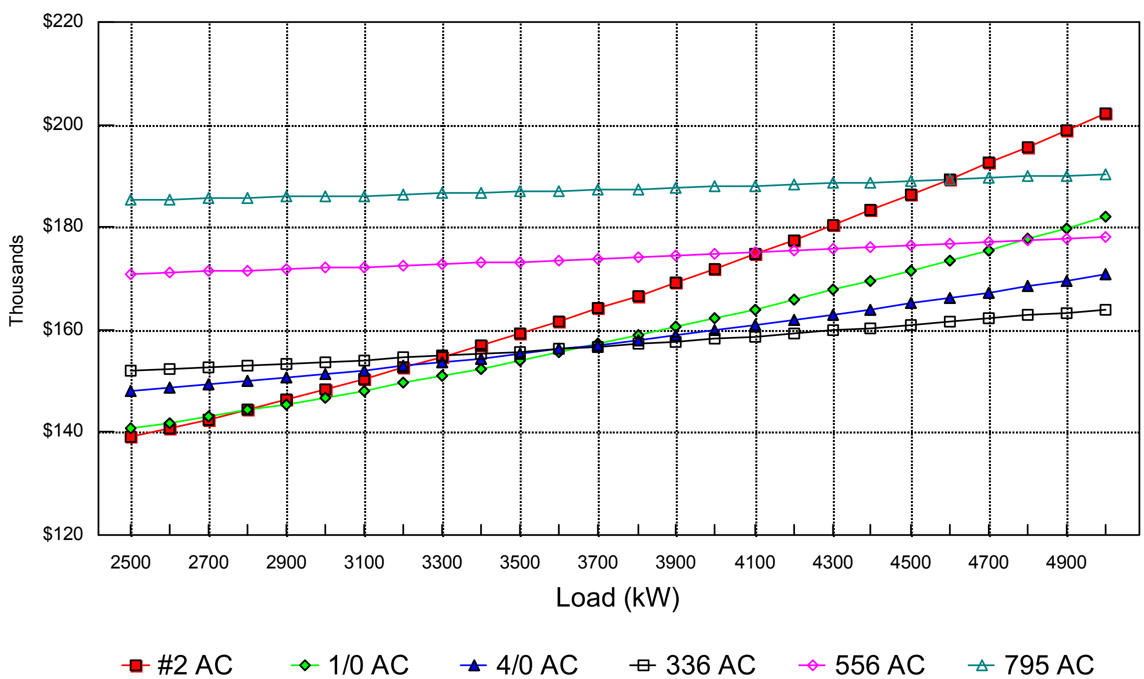
	Proposed Facilities							Existing Facilities				
kW	1-2 AC	2 AC	1/0 AC	4/0 AC	336 AC	556 AC	795 AC	1-2 AC	2 AC	1/0 AC	4/0 AC	336 AC
100	60073	117985	126992	140368	147907	168593	183635	101	34	22	12	6
200	60377	118087	127058	140405	147926	168604	183643	405	135	88	49	26
300	60884	118255	127168	140466	147959	168624	183657	912	304	198	110	58
400	61592	118492	127322	140551	148004	168651	183676	1620	540	353	196	103
500	62504	118795	127521	140661	148062	168686	183700	2532	844	551	305	161
600	63618	119167	127763	140796	148133	168728	183730	3646	1215	794	440	232
700	64935	119606	128050	140955	148217	168779	183766	4963	1654	1081	599	316
800	66454	120112	128381	141138	148314	168837	183807	6482	2161	1411	782	413
900	68176	120686	128756	141346	148424	168903	183853	8204	2735	1786	990	523
1000	70100	121327	129175	141578	148546	168976	183905	10128	3376	2205	1222	646
1100	72227	122036	129638	141834	148682	169058	183962	12255	4085	2668	1479	781
1200	74556	122813	130145	142115	148830	169147	184025	14584	4861	3175	1760	930
1300	77088	123657	130696	142421	148992	169244	184093	17116	5705	3727	2065	1091
1400	79822	124568	131292	142751	149166	169348	184167	19850	6617	4322	2395	1265
1500	82760	125547	131931	143105	149353	169461	184246	22788	7596	4962	2749	1452
1600	85899	126594	132615	143484	149553	169581	184330	25927	8642	5645	3128	1653
1700	89241	127708	133342	143887	149766	169709	184420	29269	9756	6373	3532	1866
1800	92786	128889	134114	144315	149992	169844	184515	32814	10938	7145	3959	2092
1900	96533	130139	134930	144767	150231	169988	184616	36561	12187	7960	4411	2330
2000	100483	131455	135790	145244	150483	170139	184723	40511	13504	8820	4888	2582
2100	104636	132839	136694	145745	150748	170298	184834	44664	14888	9725	5389	2847
2200	108991	134291	137642	146270	151025	170464	184951	49018	16339	10673	5914	3124
2300	113548	135810	138635	146820	151316	170639	185074	53576	17859	11665	6464	3415
2400	118308	137397	139671	147394	151619	170821	185202	58336	19445	12702	7039	3718
2500	123271	139051	140752	147993	151935	171011	185336	63299	21100	13782	7637	4035
2600	128436	140773	141876	148616	152265	171208	185475	68464	22821	14907	8261	4364
2700	133804	142562	143045	149264	152607	171414	185619	73832	24611	16075	8908	4706
2800	139374	144419	144258	149936	152962	171627	185769	79402	26467	17288	9580	5061
2900	145147	146343	145515	150633	153330	171848	185924	85175	28392	18545	10277	5429
3000	151122	148335	146816	151354	153711	172076	186085	91150	30383	19846	10998	5810
3100	157300	150394	148161	152099	154104	172313	186252	97328	32443	21191	11743	6204
3200	163681	152521	149550	152869	154511	172557	186423	103709	34570	22580	12513	6610
3300	170264	154715	150983	153663	154931	172809	186600	110292	36764	24014	13307	7030
3400	177049	156977	152461	154482	155363	173068	186783	117077	39026	25491	14126	7462
3500	184037	159307	153982	155325	155809	173335	186971	124065	41355	27013	14969	7908
3600	191228	161704	155548	156193	156267	173611	187165	131256	43752	28578	15837	8366
3700	198621	164168	157158	157085	156738	173893	187364	138649	46216	30188	16729	8837
3800	206217	166700	158812	158001	157222	174184	187568	146245	48748	31842	17646	9322
3900	214016	169299	160510	158942	157719	174482	187778	154044	51348	33540	18586	9819
4000	222017	171966	162252	159908	158229	174789	187993	162045	54015	35282	19552	10329
4100	230220	174701	164038	160897	158752	175102	188214	170248	56749	37068	20542	10852
4200	238626	177503	165868	161912	159288	175424	188440	178654	59551	38898	21556	11387
4300	247235	180372	167742	162950	159837	175753	188672	187263	62421	40773	22595	11936
4400	256046	183309	169661	164014	160398	176091	188909	196074	65358	42691	23658	12498
4500	265060	186314	171623	165101	160973	176435	189151	205088	68363	44654	24745	13072
4600	274276	189386	173630	166213	161560	176788	189399	214304	71435	46660	25857	13660
4700	283695	192526	175681	167350	162161	177148	189653	223723	74574	48711	26994	14260
4800	293316	195733	177776	168510	162774	177517	189912	233344	77781	50806	28155	14873
4900	303140	199008	179915	169696	163400	177892	190176	243168	81056	52945	29340	15499
5000	313167	202350	182098	170906	164039	178276	190446	253195	84398	55128	30550	16139

Notes: 14.4 kV operation is assumed for both proposed and existing distribution facilities.
0.000% per year load growth is assumed for both proposed and existing distribution facilities.
2.130% per year escalation in loss costs is assumed.

PV Annual Cost/Mile of Proposed 14.4 kV Facilities w/o Load Growth



PV Annual Cost/Mile of Proposed 14.4 kV Facilities w/o Load Growth



Projected Avoided Cost of Losses

Year	(1) Capacity $/kW-Yr	(2) Energy Mills/kWh	(3) System Load Factor	Total Cost $/kW-Yr
2004	$53.16	25.30	42.5%	$101.86
2005	$60.96	22.00	42.7%	$103.64
2006	$51.72	23.20	42.6%	$96.55
2007	$60.24	24.40	42.6%	$107.39
2008	$90.12	24.00	42.6%	$136.50
2009	$103.20	26.20	42.5%	$153.63
2010	$60.84	26.50	42.7%	$112.25
2011	$64.68	28.40	42.7%	$119.78
2012	$65.79	27.50	42.8%	$119.36
2013	$66.90	28.90	42.6%	$122.75
2014	$68.01	30.00	42.6%	$125.98
2015	$69.12	30.90	42.6%	$128.83
2016	$70.23	31.80	42.7%	$131.93
2017	$71.34	32.70	42.5%	$134.28
2018	$72.45	33.60	42.5%	$137.12
2019	$73.56	34.50	42.8%	$140.76
2020	$74.67	35.40	42.9%	$143.90
2021	$75.78	36.30	42.7%	$146.21
2022	$76.89	37.20	42.7%	$149.06
2023	$78.00	38.10	42.7%	$151.92

Average annual (2004-2023) cost growth rates: 2.13%

Notes:
(1) June 2002 EKPC avoided capacity costs at the substation.
(2) June 2002 EKPC avoided energy costs at the substation.
(3) System load factors are obtained from the 2002 PRS.

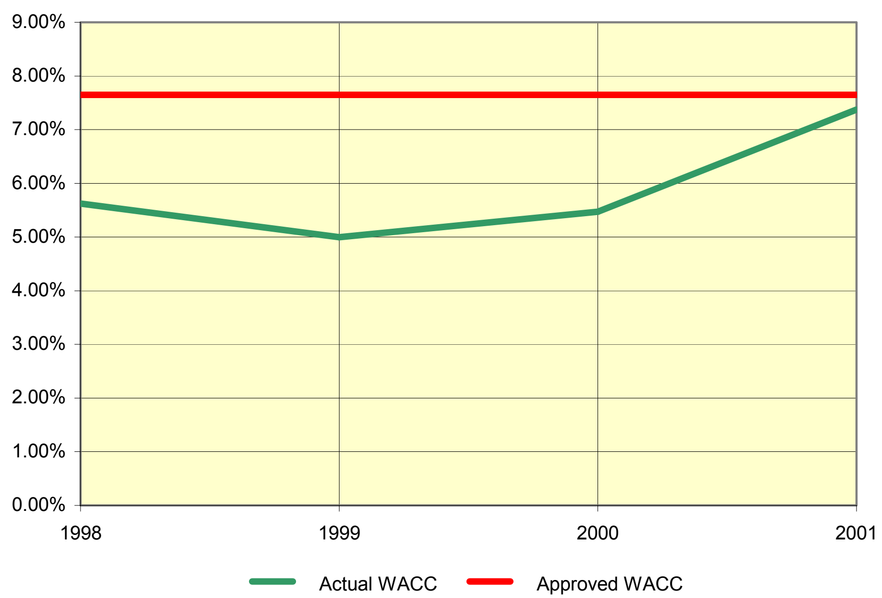
Projected Avoided Cost of Losses ($/kW-Year)

Distribution Fixed Charge Rates - Historical & Required

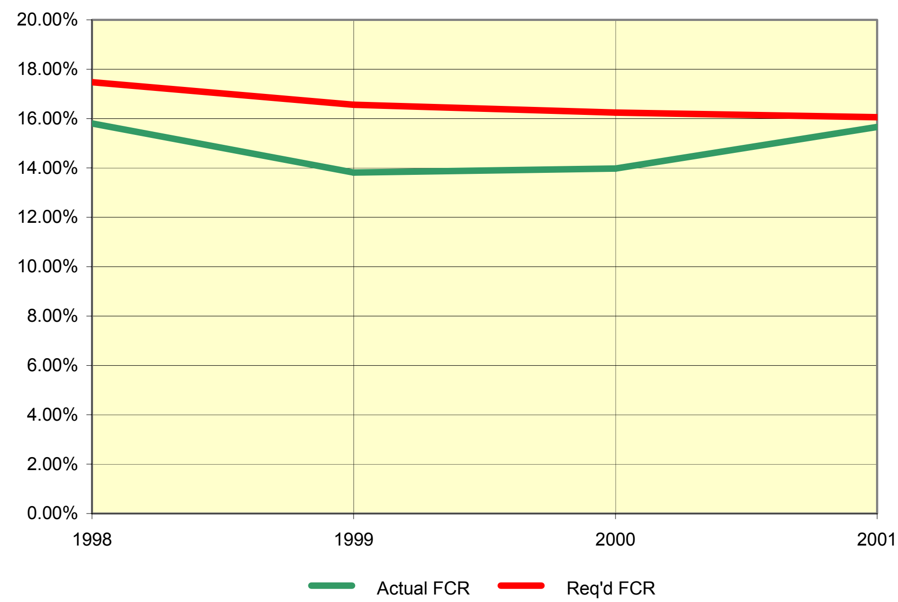
Year	Operations	Maintenance	Total O&M	LTD Interest	Depreciation	Margins	Total M & E	Total LTD	Total Utility Plant	Total Dist Plant	Accum Dist Dep	Net Dist Plant
1998	$1,090,396	$1,808,784	$2,899,180	$1,521,341	$1,498,851	$1,036,592	$17,355,622	$28,142,824	$44,721,568	$47,140,462	$4,654,036	$42,486,426
1999	$1,044,295	$1,653,977	$2,698,272	$1,594,823	$1,611,171	$835,042	$18,190,664	$30,446,647	$55,426,814	$50,732,494	$5,090,575	$45,641,919
2000	$1,018,033	$1,725,558	$2,743,591	$1,760,606	$1,732,263	$1,138,383	$19,329,048	$33,632,293	$59,485,156	$54,528,705	$5,473,671	$49,055,034
2001	$1,070,453	$1,894,738	$2,965,191	$1,846,418	$1,890,979	$2,548,635	$21,877,683	$37,723,963	$65,692,255	$60,399,079	$5,585,025	$54,814,054

Year	Debt Ratio	% O&M	% Dep	Req'd %Dep	Cost of Debt	TIER	ROE	WACC	Actual FCR	Req'd WACC	Req'd TIER	Req'd FCR
1998	61.85%	6.82%	3.35%	3.00%	5.41%	1.68	5.97%	5.62%	15.80%	7.65%	2.29	17.47%
1999	62.60%	5.91%	2.91%	3.00%	5.24%	1.52	4.59%	5.00%	13.81%	7.65%	2.33	16.56%
2000	63.50%	5.59%	2.91%	3.00%	5.23%	1.65	5.89%	5.47%	13.98%	7.65%	2.30	16.24%
2001	63.29%	5.41%	2.88%	3.00%	4.89%	2.38	11.65%	7.37%	15.66%	7.65%	2.47	16.06%
Avg	62.81%	5.93%	3.01%	3.00%	5.19%	1.81	7.03%	5.87%	14.81%	7.65%	2.35	16.58%

Weighted Average Cost of Capital



Fixed Charge Rates



Detail

Balanced Voltage Drop Report
Source: BLEVINS VALLEY

Database: D:\MILSOFT\WINTER 2007-2008 LRP MODEL\FINAL YEAR 1 WINTER.WM\
Title:
Case:

01/09/2003 14:03 Page 1

Units Displayed In Volts
-Base Voltage:120.0-

Element Name	Parent Name	Cnf	Type/ Conductor	Pri kV	Base Volt	Element Drop	Accum Drop	Thru Amps	% Cap	Thru KW	KVAR	% PF	kW Loss	% Loss	mi From Src	Element Length (mi)	Element KW	Element KVAR	Element Cons On	Element Cons Thru	
BLEVINS VALLEY		ABC	BLEVINS VA	7.56Y	126.0	0.00	0.00	165.46	0	3750	-146	-100	0.00	0.0	0.000	0.000	0	0	0	738	

----------- Feeder NO. 1 Beginning with Node Element BV1

Element Name	Parent Name	Cnf	Type/ Conductor	Pri kV	Base Volt	Element Drop	Accum Drop	Thru Amps	% Cap	Thru KW	KVAR	% PF	kW Loss	% Loss	mi From Src	Element Length (mi)	Element KW	Element KVAR	Element Cons On	Element Cons Thru	
BV1	BLEVINS VALLEY	ABC	Node	7.56Y	126.0	0.00	0.00	67.19	0	1515	167	99	0.00	0.0	0.000	0.000	0	0	0	316	
C XFMR9	BV1	ABC	Transforme	15.01Y	125.1	0.88	0.88	67.19	97	1515	167	99	5.59	0.4	0.000	0.000	0	0	0	316	C
7003	XFMR9	ABC	336ACSR	15.01Y	125.1	0.02	0.90	33.59	4	1509	111	100	0.18	0.0	0.175	0.175	14	1	5	316	
700S	7003	B	50V4E	15.01Y	125.1	-0.00	0.90	3.41	7	51	4	100	0.00	0.0	0.175	0.000	0	0	0	9	
700	700S	B	6ACWC	15.01Y	125.1	0.01	0.91	3.41	2	51	4	100	0.00	0.0	0.516	0.341	51	4	9	9	
7006	7003	ABC	336ACSR	15.01Y	125.1	0.05	0.95	32.14	4	1444	106	100	0.44	0.0	0.752	0.577	336	24	44	302	
7002	7006	ABC	336ACSR	15.00Y	125.0	0.07	1.01	23.94	3	1075	79	100	0.48	0.0	1.735	0.984	93	7	24	246	
665S	7002	B	50V4E	15.00Y	125.0	0.00	1.01	3.96	8	59	4	100	0.00	0.0	1.735	0.000	0	0	0	18	
665	665S	B	4ACSR	14.99Y	124.9	0.06	1.07	3.96	2	59	4	100	0.02	0.0	2.773	1.037	44	3	12	18	
6651	665	B	4ACSR	14.99Y	124.9	0.01	1.09	1.00	0	15	1	100	0.00	0.0	3.921	1.148	15	1	6	6	
664S	7002	A	VXE	15.00Y	125.0	-0.00	1.01	17.37	0	260	19	100	0.00	0.0	1.735	0.000	0	0	0	52	
664	664S	A	4ACSR	14.97Y	124.7	0.25	1.26	17.37	9	260	19	100	0.39	0.2	2.661	0.925	172	12	38	52	
6641S	664	A	25V4E	14.97Y	124.7	0.00	1.26	5.84	23	87	6	100	0.00	0.0	2.661	0.000	0	0	0	14	
6641	6641S	A	4ACSR	14.96Y	124.7	0.04	1.30	5.84	3	87	6	100	0.02	0.0	3.189	0.528	87	6	14	14	
P 6640	664	A	4ACSR	14.97Y	124.7	0.00	1.26	0.00	0	0	0	0	0.00	0.0	2.734	0.073	0	0	0	0	P
662S	7002	C	VXE	15.00Y	125.0	0.00	1.01	44.26	0	662	49	100	0.00	0.0	1.735	0.000	0	0	0	152	
662	662S	C	6ACWC	14.95Y	124.6	0.40	1.41	44.26	22	662	49	100	1.86	0.3	2.185	0.450	169	12	21	152	
661S	662	C	25V4E	14.95Y	124.6	-0.00	1.41	4.62	18	69	5	100	0.00	0.0	2.185	0.000	0	0	0	17	
661	661S	C	4ACSR	14.94Y	124.5	0.07	1.48	4.62	2	69	5	100	0.02	0.0	3.418	1.233	69	5	17	17	
660	662	C	4ACSR	14.93Y	124.4	0.17	1.59	28.29	14	422	31	100	0.55	0.1	2.461	0.276	39	3	5	114	
6601S	660	C	25V4E	14.93Y	124.4	0.00	1.59	5.32	21	79	6	100	0.00	0.0	2.461	0.000	0	0	0	17	
6601	6601S	C	4ACSR	14.93Y	124.4	0.04	1.62	5.32	3	79	6	100	0.01	0.0	3.034	0.573	79	6	17	17	
6602	660	C	4ACSR	14.88Y	124.0	0.39	1.97	20.35	10	303	22	100	0.89	0.3	3.303	0.842	18	1	7	92	
657S	6602	C	50V4E	14.88Y	124.0	-0.00	1.97	19.13	38	284	21	100	0.00	0.0	3.303	0.000	0	0	0	85	
657	657S	C	6ACWC	14.83Y	123.6	0.43	2.40	19.13	10	284	21	100	0.78	0.3	4.604	1.301	145	10	37	85	
656	657	C	4ACSR	14.83Y	123.6	0.05	2.45	8.49	4	126	9	100	0.04	0.0	4.888	0.284	48	3	13	42	
6562S	656	C	25V4E	14.83Y	123.6	0.00	2.45	2.60	10	38	3	100	0.00	0.0	4.888	0.000	0	0	0	14	
6562	6562S	C	4ACSR	14.82Y	123.5	0.04	2.49	2.60	1	38	3	100	0.01	0.0	5.962	1.074	25	2	9	14	
6563	6562	C	4ACSR	14.82Y	123.5	0.02	2.51	0.92	0	14	1	100	0.00	0.0	7.645	1.683	14	1	5	5	
6561S	656	C	25V4E	14.83Y	123.6	0.00	2.45	2.61	10	39	3	100	0.00	0.0	4.888	0.000	0	0	0	15	
6561	6561S	C	4ACSR	14.82Y	123.5	0.04	2.48	2.61	1	39	3	100	0.01	0.0	6.096	1.209	39	3	15	15	
655	657	C	4ACSR	14.83Y	123.6	0.01	2.41	0.87	0	13	1	100	0.00	0.0	5.608	1.004	13	1	6	6	
7001	7006	B	4ACSR	15.00Y	125.0	0.02	0.97	2.18	1	33	2	100	0.00	0.0	1.546	0.794	33	2	12	12	

----------- Feeder NO. 3 Beginning with Node Element BV3

Element Name	Parent Name	Cnf	Type/ Conductor	Pri kV	Base Volt	Element Drop	Accum Drop	Thru Amps	% Cap	Thru KW	KVAR	% PF	kW Loss	% Loss	mi From Src	Element Length (mi)	Element KW	Element KVAR	Element Cons On	Element Cons Thru	
P BV3	BLEVINS VALLEY	ABC	Node	7.56Y	126.0	0.00	0.00	23.55	0	444	-297	-83	0.00	0.0	0.000	0.000	0	0	0	76	P

----------- Feeder NO. 2 Beginning with Node Element BV2

Element Name	Parent Name	Cnf	Type/ Conductor	Pri kV	Base Volt	Element Drop	Accum Drop	Thru Amps	% Cap	Thru KW	KVAR	% PF	kW Loss	% Loss	mi From Src	Element Length (mi)	Element KW	Element KVAR	Element Cons On	Element Cons Thru
BV2	BLEVINS VALLEY	ABC	Node	7.56Y	126.0	0.00	0.00	78.99	0	1791	-16	-100	0.00	0.0	0.000	0.000	0	0	0	346

	Load	Adjustment	Capacitance	Charging	Gen&Motors	Loops&Metas	Losses	No Load Losses	Total
KW	1503	0	0	0	0	2235	11	0.00	3750
KVAR	106	0	0	0	0	-313	61		-146

Lowest Voltage = 123.49 on Element 6563
Max Accm VoltD = 2.51 on Element 6563
Max Elem VoltD = 0.88 on Element XFMR9

DCT DESIGN GROUP, LTD.
Architecture and Interior Design 225 Walton Avenue Suite 20 Lexington, Kentucky 40502
Phone 859.255.4444
Fax 859.255.4200

December 13, 2002

Shannon Messer
Clark Energy Cooperative
2640 Iron Works Road
Winchester, KY 40392

Reference: New Addition

Dear Mr. Messer,

This letter is to inform you that the new addition to Clark Energy has been designed following recommended building practices and the code requirements per the new 2002 Kentucky Building Codes as issued by the Kentucky Department of Housing, Buildings and Construction. There are also new seismic requirements as a part of the new code that is different from the design of the original building. The new addition has been designed to meet the requirements, but the existing building may not. The new men's restroom has been planned per the Americans with Disabilities Act Accessibility Guidelines. The existing portion of your building will be upgraded to the building code as a part of the approval for the new addition. We are still waiting for the final review of this area by the DHBC to determine the extent of upgrading required. Your existing restrooms for male and female have been renovated in a previous renovation per ADA requirements.

Please call if you have any additional questions.

Sincerely,

Duane Culp, AIA
DCT Design Group, Ltd

U. S. DEPARTMENT OF AGRICULTURE
RURAL ELECTRIFICATION ADMINISTRATION

APPLICATION FOR HEADQUARTERS FACILITIES

Form Approved
OMB No. 40-R2553

BORROWER DESIGNATION: Ky 049

NAME OF BORROWER: CLARK ENERGY COOPERATIVE

INSTRUCTIONS • *Submit to REA an original and four (4) copies and applicable supporting data. See reverse for detailed instructions.*

1. PURPOSE OF PROJECT *(Purchase, remodel or construct, main or branch facilities)*

CONSTRUCT ADDITION & REMODEL MAIN OFFICE BUILDING

2. ESTIMATED COST OF PROJECT:	BORROWER'S ESTIMATED COST	REA USE ONLY
a. PURCHASE PRICE OF PROPERTY *(exclude value of land and show in Item p)*	$	$
b. OFFICE PORTION *(Construction* ____ *Sq. Ft.@* ____ *Per Sq. Ft.)*		
c. OFFICE PORTION *(Remodeling)*	1,115,000	
d. SERVICE PORTION *(Construction* ____ *Sq. Ft.@* ____ *Per Sq. Ft.)*		
e. SERVICE PORTION *(Remodeling)*		
f. AIR CONDITIONING		
g. SITE DEVELOPMENT *(Grading, roads, drainage structures, etc.)*		
h. FENCE ____ LINEAR FT. @ ____ PER FT. *(Height* ____ *Ft.)*		
i. WATER SUPPLY *(Well, well house, pump, long connection to main, water treatment, etc.)*		
j. SEWAGE DISPOSAL *(Disposal System, long connection to main, etc.)*		
k.		
l.		
m. CONTINGENCIES		
n. SUBTOTAL	$	$
o. ARCHITECTURAL SERVICES	85,000.00	
p. LAND		
q. LEGAL EXPENSES		
r. TOTAL	$1,200,000	$

3. INVESTMENT GUIDELINES *(See Paragraph III, REA Bulletin 86-3, Headquarters Facilities for Electric Borrowers):*

*a. TOTAL DISTRIBUTION PLANT *(REA Form 7a, Part A, Item 12)*	$60,399,080	
b. TOTAL ESTIMATED HEADQUARTERS COST LESS LAND *(Item 2r minus 2p above)*	$ 1,200,000	
c. CURRENT INVESTMENT IN HEADQUARTERS FACILITIES TO BE RETAINED *(REA Account 390, Structures and Improvements)*	$ 1,382,843	
d. TOTAL ESTIMATED INVESTMENT IN HEADQUARTERS FACILITIES *(Item 3b plus 3c)*	$ 2,582,843	
*e. SEVEN PERCENT OF ITEM 3a	$ 4,227,936	
*f. ITEM 3d MINUS 3e *(Explain need for funds in excess of zero under "Remarks" below)*	$(1,645,093)	

**Does not apply to power type borrowers*

4a. NO. OF EMPLOYEES REQUIRING DESK SPACE: 49

4b. NO. OF VEHICLES TO BE GARAGED: N/A

5a. DID ARCHITECT ASSIST IN PREPARATION OF COST ESTIMATE?

[X] YES [ ] NO

b. NAME OF ARCHITECT

DUANE CULP C/O DCT DESIGN GROUP, LTD

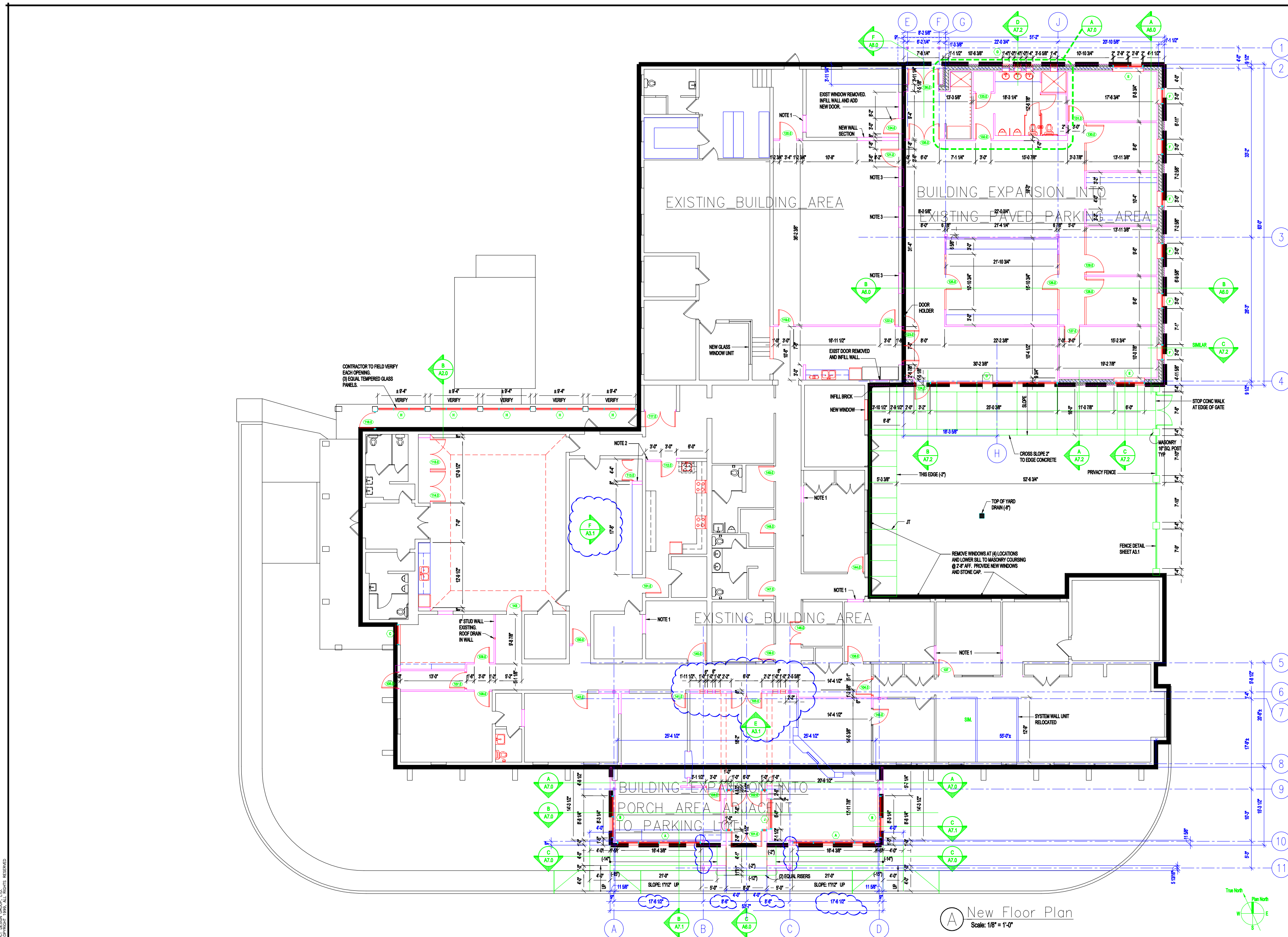
6. METHOD OF FINANCING	
a. REA LOAN	$ 1,200,000
b. GENERAL FUNDS	-0-
c. OTHER *(Specify)*	-0-
d. TOTAL	$ 1,200,000

REMARKS

These data approved in accordance with a resolution adopted by the Board of Directors on ____________, 19____.
The facilities described on this application will be designed and constructed to comply with the minimum standards contained in the American National Standards No. A117.1 - 1961, to insure that the facilities will be made accessible to and usable by the physically handicapped as required by Public Law 90-480 (42 U.S.C. 4151). The following portions of the project need not be made accessible to, or usable by the public or the physically handicapped because of their intended use: *(Insert "None" or describe fully with the supporting data).*

SIGNATURE OF MANAGER	DATE	SIGNATURE OF PRESIDENT	DATE
[signature]	1-27-03	[signature]	1-27-03

FORM 740g REV 3-72



A New Floor Plan
Scale: 1/8" = 1'-0"

NOTES:

1. REMOVE EXISTING DOOR AND FRAME. FILL OPENING WITH NEW CONSTRUCTION FLUSH WITH EXISTING AND SEAMLESS.
2. PROVIDE NEW STEEL STUD WALL w/ 5/8" GYPSUM BOARD.
3. REMOVE EXISTING WINDOW AND FRAME. FILL OPENING WITH NEW CONSTRUCTION FLUSH WITH EXISTING AND SEAMLESS.

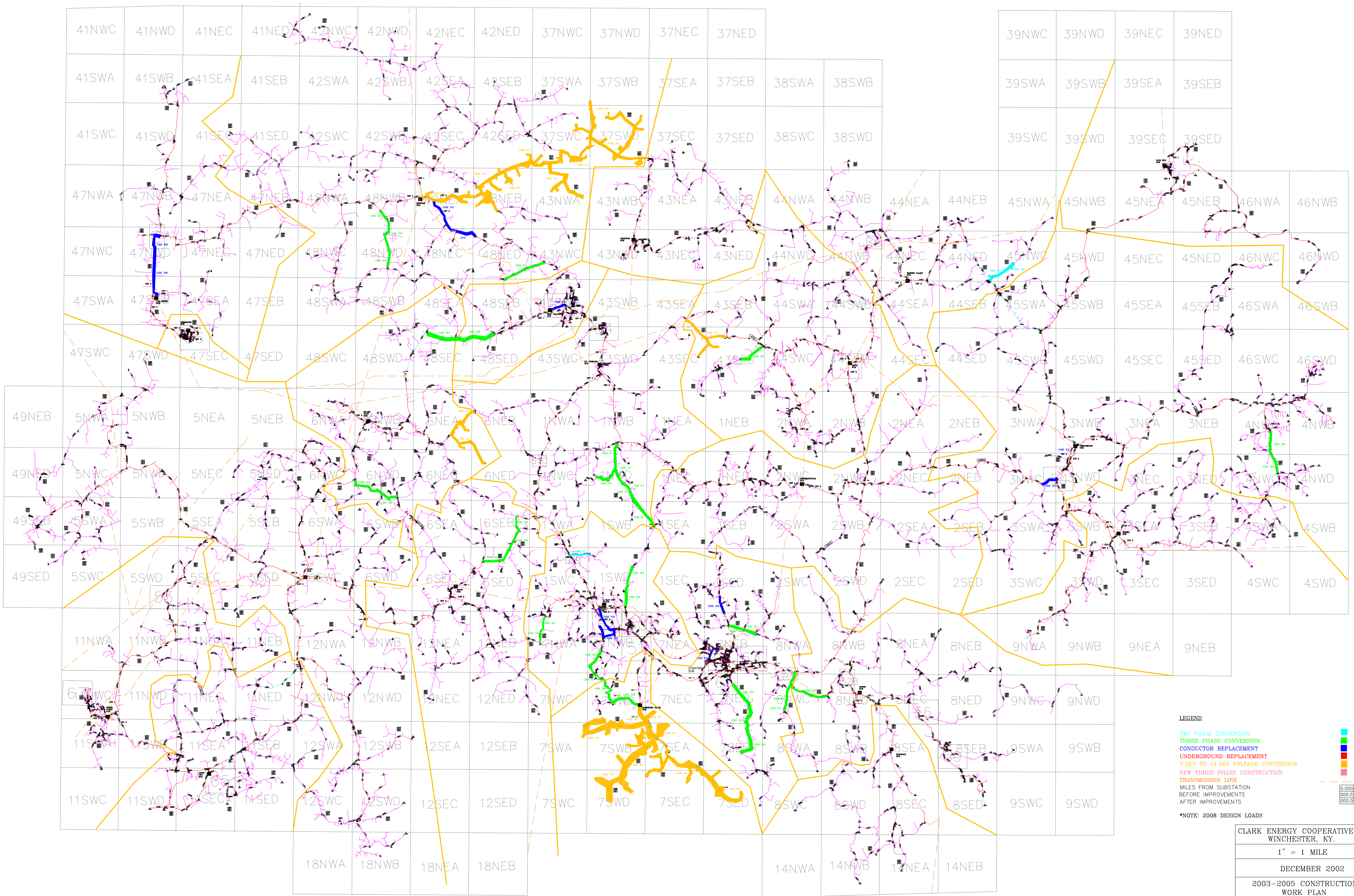
PROJECT:
Proposed Addition:
Clark Energy
Cooperative

Winchester, Kentucky

OWNER:
Clark Energy
Cooperative

DCT DESIGN GROUP, Ltd.
Architecture, Planning, Interior Design
225 Walton Avenue. Suite 120
Lexington, Kentucky 40502-1452
Telephone: (859) 255-4444

DATE: Revised-Dec. 4, 2002
CHECKED: Duane Culp
DRAWN BY: KM/JP
PROJECT NO.: 0203
SHEET TITLE:
New Floor Plan
SHEET
A2.0



LEGEND

TWO PHASE CONVERSION
THREE PHASE CONVERSION
CONDUCTOR REPLACEMENT
UNDERGROUND REPLACEMENT
7.2KV TO 14.4KV VOLTAGE CONVERSION
NEW THREE PHASE CONSTRUCTION
TRANSMISSION LINE
MILES FROM SUBSTATION 0.000
BEFORE IMPROVEMENTS 000.0
AFTER IMPROVEMENTS 000.0

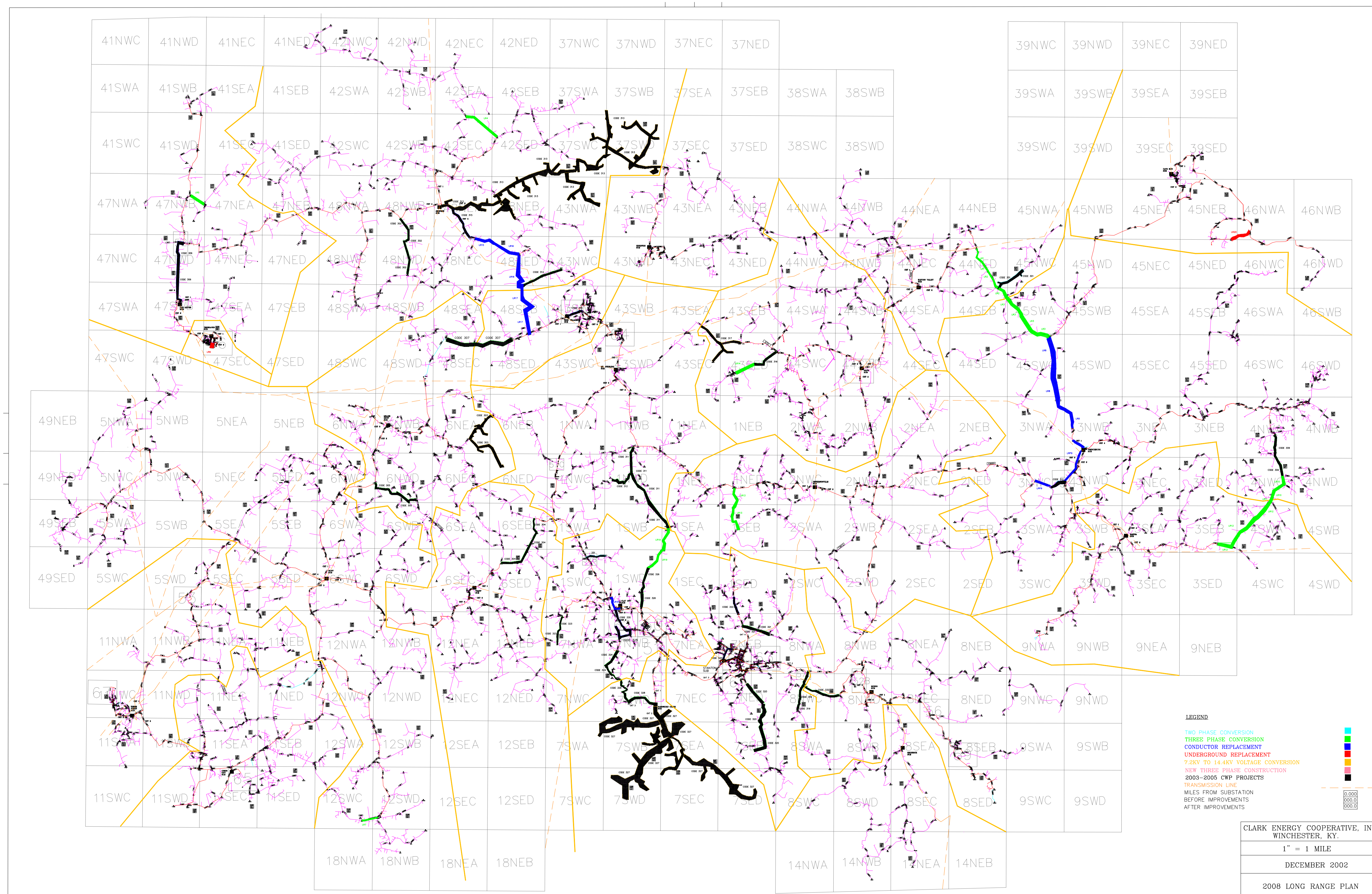
*NOTE: 2008 DESIGN LOADS

CLARK ENERGY COOPERATIVE, INC
WINCHESTER, KY.

1" = 1 MILE

DECEMBER 2002

2003–2005 CONSTRUCTION
WORK PLAN


LEGEND
TWO PHASE CONVERSION
THREE PHASE CONVERSION
CONDUCTOR REPLACEMENT
UNDERGROUND REPLACEMENT
7.2KV TO 14.4KV VOLTAGE CONVERSION
NEW THREE PHASE CONSTRUCTION
2003–2005 CWP PROJECTS
TRANSMISSION LINE
MILES FROM SUBSTATION
BEFORE IMPROVEMENTS
AFTER IMPROVEMENTS
0.000
000.0
000.0
CLARK ENERGY COOPERATIVE, INC
WINCHESTER, KY.
1" = 1 MILE
DECEMBER 2002
2008 LONG RANGE PLAN