# WILSON CONSULTING, INC

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Email: rogerwil@alltel.net

June 2, 2004

RECEIVED

JUN 1 0 2004

Beth O'Donnell, Executive Director Kentucky Public Service Commission PO Box 615 Frankfort KY 40602 PUBLIC SERVICE

RE: Nolin RECC Elizabethtown, KY - Case number 2004-00160

Dear Ms. O'Donnell:

Enclosed are supporting documents and answers to the three inquires within your letter dated May 25,2004 on Nolin RECC's 2003-2005 Construction Work Plan(CWP), which was submitted to you as Case number 2004-00160. Please accept this letter as part of the filing of the case. The information you requested is as follows:

- 1. (b) Copies of franchises or permits, if any, from the proper public authority for the proposed new construction or extension, if not previously filed with the commission.
- o The proposed facilities set forth in the Construction Work Plan does not require any franchises or permits from the public authorities, other than work specific construction permits for passing along road right-of-ways or railroad crossings, which will need to be applied for, if necessary, during the actual construction.
- 2. (e) The manner, in detail, in which it is proposed to finance the new construction or extension.
- o The Applicant has secured a loan for the funds necessary to construct the proposed facilities from the United States of America, acting by and through the Administrator of the Rural Utilities Service ("RUS").

- 3. (f) An estimated cost of operation after the proposed facilities are completed.
- o The Applicant's estimated cost of operation after the CWP is completed is shown in the Applicant's 2000-2010 Ten Year Financial Forecast, with excerpts from it attached hereto and made a part of this letter as a supporting document.

Should you have any questions, please feel free to contact me.

Sincerely,

Roger Wilson, PE

Wilson Consulting, INC

**Enclosures** 

# III. Criteria for Long Range System Planning

#### A. Load Levels

The long range load criteria was established for Nolin RECC by the engineering consultant that is consistent with the most recent Load Forecast. The Long Range Plan shall be designed to support a long range peak demand of approximately 2.1 times the 146.9 MW non-coincident demand that occurred during the winter of 1999-2000. This demand level is between the "normal winter case" and "extreme weather case" (probability of occurrence is one in ten years) as projected by Nolin RECC's 1998 Power Requirement Study. When developing a long-range plan it is desirable to have a time frame and the corresponding load level such that major system improvements are necessary. This allows for various plans to be analyzed and compared on a present worth basis. The twenty-year projected load of 2.1 times the present system peak meets this criterion of stressing the system to the point in which major improvements are necessary.

To make the load projections, each individual substation area was analyzed. The historical growth and any known future expansions were considered on a substation and circuit basis. These individual substation and circuit projections were summarized and compared to the Power Requirements Study. Adjustments were made as necessary to achieve similar results contained in the Power Requirements Study. A computer model of the system was used to distribute the load projected within a substation area to the line sections. Graphs of each planning area and the total systems kW demand are included in Appendix A.

The following page contains a summary of the criteria for the System Planning Report Load Levels in MW.

## B. Voltage Drops

The criteria used in determining the permissible voltage drops throughout the design phase of this study was 8 volts. The criteria allowed the use of line voltage regulators to compensate for voltage drop from the substation to the end consumer. Each substation is equipped with bus voltage regulation. Only one set of line voltage regulators is considered allowable by this planning criterion.

## C. Single Contingency Outage

The system should be designed so that a single contingency outage can be safely isolated and the rest of the system may continue to operate based on the emergency ratings of the system components affected by the outage. This is essential, not only for maintaining high levels of reliability, but also to allow for the maintenance of specific devices and lines on the electric system. This criterion is not a hard and fast rule, but rather, is a goal for the distribution system.

## D. Capacity of System Components

The overhead conductors on the distribution system will be assigned capacity levels for both winter and summer. Any line which is required to carry more than its capacity based on its design operating temperature shall be reviewed in the field to verify its ability to carry the increase in load and still maintain the safety requirements as established by the latest revision of

Nolin Rural Electric Co-op Corporation Recommended Long Range Plan 2000 System Planning Report Proposed System Configuration

Substation	Existing Peak	Load Block A	Load Block B	Load Block C
Colesburg	2.9	3.9	4.5	6.0
Elizabethtown	9.5	14.2	17.0	23.8
Fort Knox	11.4	13.6	16.0	19.9
Glendale	6.9	8.8	10.2	13.0
Hogdenville	8.3	10.5	11.9	16.5
Kargle #1	5.9	6.2	6.2	6.2
Kargle #2	8.4	9.3	9.3	9.3
Logsden	0.0	0,0	0.0	0.0
Magnolia	6.7	8.4	9.5	10.8
Radcliffe/Logsden	16.7	19.7	23.4	31,0
Smithersville #1 & 2	12.0	21.3	25.8	34.6
Stephensburg	5.6	7.2	8.2	10.4
Tharp	9.3	14.0	15.5	18.7
Tunnel Hill	12,1	11.6	13.8	17,5
Upton	3.7	5.0	5.8	7.8
Vertrees	5.3	8.1	10.3	14.0
Vine Grove	12.0	17.0	19.7	26.9
Williams	10.3	15.5	18.5	23.2
Fotal	146.9	194.3	225.6	289.6

the NESC and by any local standards which may apply. Specifically, the clearance of energized conductors will need to meet or exceed the clearances as established by the NESC during maximum sag conditions. The ratings will be based on the following guidelines:

## Ampacity of Overhead Conductors

	Summer	Winter	Summer
Ambient Temp.	35 C	-10 C	35 C
Conductor Temp.	50 C	50 C	75 C
2 ACSR	89	210	N/A
1/0 ACSR	114	277	210
3/0 ACSR	146	364	273
4/0 ACSR	164	416	309
336 ACSR	221	578	448

These rating shall not be exceeded for the use in planning the system during normal operating conditions. All underground cable shall not be loaded beyond the normal loading recommendations of the cable manufacturers. These recommendations should take into account the installation method used, i.e., direct buried, conduit, riser pole.

It is recommended that Nolin RECC design all of their new, large overhead conductors for 75 C (167 F). For some sections of line, this may prove to be prohibitively expensive and should not be done. However, by designing, installing, and maintaining their main overhead conductors at the higher temperature level, Nolin RECC will be able to backfeed more efficiently in the event of an emergency.

## E. Financial Data

One of the comparisons of alternate plans is accomplished with a present analysis. The financial data to be used in the present worth analysis can be found on the following page. The format used to calculate the fixed charge rate is recommended in RUS Bulletin 1724D-101A. Data was obtained from Nolin RECC's current Form 7s and from other financial records at the Cooperative. Other values used in present worth analysis were obtained from East Kentucky Power. A copy of this data is contained in the Appendix for reference.

# Nolin Rural Electric Co-op Corporation 2000 System Planning Report Kentucky 51 Annual Fixed Charge Rate

Net Ti	ER		
	Interest [Part A, line 15b]	1998	1999
	Margins [Part A, line 28b]	\$ 1,182,34	5 \$ 1,254,238
	Net TIER	\$ 909,25	8 \$ 1,031,197
	· · · · · · · · · · · · · · · · · · ·		77 1.82
Capita	! Structure		
	LODG Term Dobt (Dod 0 "	1998	1999
	Long Term Debt [Part C, line 41] Total Marg.&Eq. [Part C, line 36]	\$ 22,601,37:	3 \$ 30,187,704
	Debt Ratio	\$ 20,649,75°	1 \$ 19,569,539
	DOM: (NEED)	52,26	
Cost of	Capital		
	RUS	% of Debt Interest Rate	Component
	Supplemental Lender	70% 5.50%	
	Cost of Debt	30% 7.009	
	Odd: Of Debt		5.95%
	Embedded Cost of Debt	1998	1999
	Weighted Cost of Debt	5.23%	4.15%
	Cost of Capital	3.11%	3.61%
	Cost of Capital with TIER = 2.0	5.50%	6.58%
	out or capital wild! TIER = 2.0	6.22%	7.22%
Operatio	ons & Maintenance		
	Net Dist. Plant	1998	1999
	Dist. Operations [Part A, line 5b]	\$ 39,913,776	
	Dist. Maintenance [Part A, line 5b]	\$ 1,315,901	
	% O&M	\$ 1,513,726	
Taxes		7.09%	7.25%
	Propert Tax [Part A, line 13b]	1998	1999
	Plant [Part C, line 5+line20]	\$ 287,919	
	Tax Rate	\$ 43,199,871	\$ 46,599,748
		0.67%	0.62%
Depreciat	tion		
	Net Depreciation of Dist Plant	1998	1999
	Hot Depreciation of Dist Plant	5.14%	5.14%
Total Anni	ual Fixed Charge Rate		
	Cost of Capital with Time	1998	1999
	Cost of Capital with TIER = 2.0 % O&M	6.22%	7.22%
	Tax Rate	7.09%	7.25%
		0.67%	0.62%
	Net Depreciation of Dist Plant	5.14%	5.14%
	Total Annual Fixed Charge Rate	19.11%	20.23%
	Fixed Charge Rate to be Used	19.67%	

## Nolin Rural Electric Go-op Corporation Recommended Long Range Plan 2000 System Planning Report Present Worth Analysis

Distribution Cost	Calender	2000			_							
Delair (2000)						_				2008	2009	2010
Definit (2000)		•	•	٠.	2 ;	3 ,	4 5		3	8	9	
	Distribution Cost											
	Dollars (2000)	50	\$803 5A4	SECTION	5202 000							
Total Annual investment	inflated Cost											\$551,832
Carrying Cost Factor   19,87%	Total Annual Investment	\$0					,				\$690,397	\$706,386
Carrying Cost	Carrying Cost Factor	19.57%					,					\$7,682,015
Present Worth Factor   1.00	Carrying Cost	50									19.67%	19,67%
Member Service	Present Worth Factor	1.00									\$1,372,106	\$1,511,052
Member Service   Colian (2000)   50   51,932,733   51,932,733   51,932,733   51,932,733   51,932,733   51,932,733   51,932,733   51,932,733   51,932,733   51,932,609   51,925,069   51,9	Present Worth	\$0	\$151,165								0.54	0.51
Dollars (2000)				V,V	4100,011	#510,335	9000,348	3048,821	\$587,253	\$719,541	\$746,335	\$768,142
Inflated Cost												
Second   S		\$0	\$1,932,733	\$1,932,733	\$1 932 733	\$1 012 715	E1 027 722	fe fine ove	** *** ***			
Tall Annual Investment 50 \$1,977,495 \$4,000,798 \$5,070,941 \$81,890.039 \$10,2564,745 \$12,924,445 \$17,179,1845 \$19,5774 \$19,6774 \$1		\$0	51,977,495	\$2,023,293								
Carrying Cost Factor 16,67% 19		\$0	\$1,977,495	\$4,000,788								
Parsent Worth Factor   1.00   0.93   0.97   0.02   0.75   0.02		19,67%	19.67%	19.87%								
Present Worth Factor   1,00   0,93   0,87   0,92   0,78   0,71   0,67   0,62   0,58   0,54   0,51			\$368,973	\$788,955								
Substation Cost			0.93	0.87	0.82							
Substation Cost	Present Worth	\$0	\$363,526	\$667,357	5974,785							
Delian (2000)   \$0   \$0   \$0   \$248,000   \$328,000   \$124,000   \$1328,000   \$1090%   \$1090%   \$10,	<b>=</b> 4						5., .02,000	91,040,000	#1,013,510	31,361,005	\$2,086,560	\$2,192,075
Inflieted Cost												
Trotal Annual investment				\$248,000	\$328,000	\$124,000	\$894,000	\$984,000	sn.	5958 000	\$378 and	****
Second   Carrying Cost   Factor   Cost					\$354,100	\$137,327	\$1,015,580					
Carrying Cost Factor 10.90% 10					\$615,087	\$752,414	\$1,768,094					
Same					10,90%	10.90%	10.90%					
Present Worth 100 0.93 0.87 0.82 0.78 0.71 0.67 0.67 0.62 0.58 0.54 0.51 5268,832    Transmission Cost Dollars (2000)					\$67,044	\$82,013	S192,722	\$317,727				
Transmission Cost Dollars (2000)  50 50 50 50 50 50 50 50 50 50 50 50 50					0.82	0.78	0.71					
Transmission Cost Dollars (2000) \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0	Ludeally AARS (6)	20	50	<b>\$24,847</b>	\$54,728	\$62,567	\$137,408	\$211,715			-,	
Inflated Cost	Transmission Cost									•		,
Inflated Cost   \$0   \$0   \$0   \$0   \$0   \$0   \$0   \$	Dollars (2000)	\$0	a2	50	**		****					
Total Annual Investment 50 S0 S0 S0 S0 S0 S0 S1,130,881	Infleted Cost	\$0										\$0
Carrying Cosi Factor 12.52% 12		50	SO									
Cast of Losses kW (Peak Month) 3079 34262 3773.4 4120.8 4467.8 44		12.52%	12.52%									\$2,514,531
Present Worth Factor 1.00 0.93 0.87 0.82 0.78 0.71 0.67 0.62 0.58 0.54 0.51 0.54 0.51 0.54 0.54 0.51 0.54 0.54 0.51 0.54 0.54 0.51 0.54 0.54 0.51 0.54 0.54 0.54 0.54 0.54 0.54 0.54 0.54		\$0	50	\$0								
Present Worth So			0.93	0.87								
Cost of Losses kW (Peak Month) 3079 3426.2 3773.4 4120.8 4467.8 4815 4916.8 5018.6 5120.4 5222.2 5324 kW (Peak Month) 7.012.730 7.603.513 8.594.296 9.385.079 10,175.861 10,965.644 11,198.504 11,430.363 11,662.223 11,894.083 12,125.942 54.000 542.91 542.9	Present Worth	02	\$0	\$0								
kW (Peak Month)         3079         3428.2         3773.4         4120.6         4467.8         4815         4916.8         5018.6         5120.4         5222.2         5324           kWh (Annually)         7.012.730         7,603,513         8,594,296         9,385,079         10,175,861         10,966,644         11,198,504         11,430,363         11,682,223         11,894,083         12,125,942           \$AkW (2000)         \$0.02340         \$0.							\$700,575	204,343	200,173	\$183,228	5171,241	\$160,038
kWh (Annually) 7.012.730 7,603,513 8,594,296 9,385,079 10,175,881 10,396,644 11,198,504 11,430,363 11,662,223 11,884,023 12,125,942   \$\( \) \$												
RAW (2000   S42.91				3773.4	4120.8	4467.8	4815	4016.8	6010 0	£430 ·		_
\$42.91 \$4				8,594,296	9,385,079	10,175,861						
50.02340 50.				\$42,91	\$42.91	\$42.91						
\$329,620 \$329,620 \$329,620 \$342,620 \$34					\$0.02340	\$0.02340	\$0,02340					
\$44.98 \$44.98 \$46.05 \$47.15 \$48.27 \$49.42 \$50.025 \$					\$396,426	\$429,828	\$463,231					
9.002430 \$0.02430 \$0.02430 \$0.02430 \$0.02513 \$0.02605 \$0.02609 \$0.02797 \$0.02899 \$0.03040 \$0.03131 \$0.03226 \$0.03343 \$0.03430 \$0.					\$46.05	\$47.15	\$48.27				,	
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	Present Worth Dollars									54,975,633	\$3,317,307	\$3,327,101
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a Inspection Program and Records b. Compilance with Safety Codes	ł						N/A			
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PART IL OPERATIONS and MAINTENANCE   Clause Maintenance and Work Order Procedures   (Rating)   2   Clearers Freedom from Complaints   3	c, Observ	ed Physical	Condition fr	om Field Chee	king:	-		-		
Chief					-	Vav	,	1		
North Planting & Scheduling   3   2   2   2   2   2   2   2   2   2								1		
North Planting & Scheduling   3   2   2   2   2   2   2   2   2   2								†		
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Description   Right-of-Way Maintenance   3   Poles   3   Poles   3   Poles   3   Actionness of lefte Services   3   5   Distribution Transformer Loading   3   Distribution Transformer Complaints   3   Distribution Transformer Loading   3   Distribution Transformer Complaints   3   Distribution Transformer Loading   3   Distribution Transformer Complaints   3   Distribution Transformer Loading   3   Distribution Transformer Loading   3   Distributi				rder Procedu			(Rating)	& Power Qu	ality	(Nation)
Poles   Ratirement of Idle Services   3   9. Londing and Load Rulance   2   2   2   2   2   2   2   2   1.67   47.11   2   1.99   0.03   0.44   0.04   0.61   1.12   3   1.997   0.03   0.51   0.06   0.09   1.69   3   3   3   2   2   2   2   2   2   3   3			eneomina	Disks - CHr.			3	_ General )	Freedom from Complaints	
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7. Service laterruptions 2. Average Analysis   Consider by Cause (Comoleus fay such of the previous 1 years)  PREVIOUS   COWER   MAJOR   SCHEDULED   ALL   OTHER   OTH					I sent DELAIC	23				3
S. Average Anaual Hours/Consumer by Cause (Complete far and of the previous 1 years)   PREVIOUS   PREVIOUS   POWER   MAJOR   SCHEDULED   ALL   TOTAL	7. Service I	nterruption								N/A
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SUPPLIES   SUPPLIES   STORM   C.   d.   C.   (Rating)   D.   C.   d.   C.   (Rating)   D.   Circuit Diagrams   3	PREVIOUS	POWER	MAJOR	SCHOOLLED		I -	A 3 Acous)	1		
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1994 0.00 45.22 0.22 1.67 47.11 2 1995 0.14 0.47 0.02 1.30 2.13 3 1996 0.03 0.44 0.04 0.61 1.12 3 1997 0.03 0.51 0.06 1.09 1.69 3  b. Emergency Restoration Plan 3  PART III. ENGINEERING  1. System Load Conditions and Losses (Rating) a. Annual System Losses 4.90% 3 a. Long Range Engineering Plan J b. Annual Load Factor 46.9% 3 b. Construction Work Plan J c. Fower Factor at Monthly Peak 98.6% 3 c. Sectionalizing Study 3 d. Ratios of Individual Substation Annual Peak kW to kVA 3 d. Load Data for Engineering Studies a. Voltage Conditions a. Voltage Conditions a. Voltage Surveys 5 b. Substation Transformer Output Voltage Spread 3  US FORM 300 (2/98)	1993	0.00	15.21	_				1	_	3
1995   0.14   0.47   0.02   1.30   2.13   3   1996   0.03   0.44   0.04   0.61   1.12   3   1997   0.03   0.51   0.06   1.69   1.69   3   3   5   5   5   5   5   5   5   5	1994	0.00			-		<del> </del>	C. Staking S	heels	3
1996   0.03   0.44   0.04   0.61   1.12   3   3   5   1.997   0.03   0.51   0.06   1.09   1.69   3   5   5   5   5   5   5   5   5   5	1995	0,14	0.47				<del></del>	ļ		
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