DOCKET 100304-EU

DIRECT TESTIMONY OF

JACQUELYN NICOLE SULLIVAN

ON BEHALF OF CHOCTAWHATCHEE ELECTRIC COOPERIATIVE, INC.

Q. PLEASE STATE YOUR NAME AND ADDRESS FOR THE RECORD.

A. Jacquelyn Nicole Sullivan. My work address is 850 Center Way, Norcross, GA 30071

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am a full time consulting engineer at Patterson & Dewar Engineers, Inc.

Q. PLEASE DESCRIBE YOUR PROFESSIONAL BACKGROUND AND EXPERIENCE?

A. I am a professionally licensed engineer in the states of SC, FL, GA, TN, KY and AL. Upon graduation from the University of SC in 1994 with a BS degree in engineering, I worked from 1994-1997 at Santee Cooper (a South Carolina owned electric company) as an electrical engineer in the distribution planning department. From 1997-2007, I worked for South Carolina Electric and Gas Co. as an electrical engineer in metering. From 2007-present I have worked for Patterson & Dewar as a Project Engineer doing system studies for various electric cooperatives across the southeastern US.

Q. WHAT ARE YOUR RESPONSIBILITIES WITH PATTERSON & DEWAR?

A. I provide electrical distribution engineering services to electric cooperative clients that Patterson & Dewar serves in the southeast. My job primarily consists of completing distribution planning studies such as Long Range System Studies (typically 10 or 20 year studies) and Construction Work Plans (CWP) (typically 2, 3 or 4 year plans) and sectionalizing studies. But, as a consulting engineer, my clients call on me for various other tasks and studies as they relate to the distribution side of the electric cooperative. Some other studies I have done for clients are Arc Flash Assessment studies, substation design, capacitor placement and voltage regulator studies, cost of service studies, and peak load reduction studies.

Q. HAVE YOU TESTIFIED BEFORE THIS COMMISSION?

A. No.

Q. ARE YOU FAMILIAR WITH THE DISPUTE BETWEEN CHELCO AND GULF POWER THAT IS THE SUBJECT OF THIS DOCKET?

A. Yes.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. To share the results of the study I completed for CHELCO for the new Freedom Walk development and to address generally other work I have performed for CHELCO.

Q. IN ADDITION TO THE STUDY FOR THE FREEDOM WALK DEVELOPMENT, WHAT OTHER WORK HAVE YOU DONE FOR CHELCO?

A. I have done some load studies for proposed substations in their service territory and I completed their 4-year 2011-2014 CWP on May 18, 2010. The CWP recommends projects system-wide over the next 4 years (through 2014).

Q. YOU SAY THE CWP "RECOMMENDS" PROJECTS SYSTEMWIDE. DOES THE CWP BECOME A PLANNING DOCUMENT FOR CHELCO?

A. Yes, CHELCO's CWP serves as a "working document" for their engineering and operations department. In addition to the other daily operations and maintenance that their engineering department is responsible for, they also do projects to strengthen their system and prepare it for future growth and those projects come from their CWP.

Q. DID THE CWP INCLUDE THE FREEDOM WALK PROJECTED LOAD?

A. No. I was not aware of the Freedom Walk development or any development or load under any other name for the area where the Freedom Walk development is to be located. The first I heard of Freedom Walk was sometime in July 2010, about 2 months after the CWP was completed.

Q. WERE THERE ANY PROJECTS RECOMMENDED NEAR THE AREA OF THE FREEDOM WALK DEVELOPMENT?

A. Yes, there is one project in the CWP that is near this development.

Q. EXPLAIN BRIEFLY THAT PROJECT AND WHY THERE WAS A NEED FOR IT.

A. The project is coded as 300-RU10-01 in the CWP and it calls for upgrading 1.3 miles of existing 394 AAAC conductor to 741 AAAC along Hwy 85, on Auburn Substation circuit 03, south of the sub.

CHELCO has a System Design and Operational Criteria (SDOC) that they use as a guide to determine when to upgrade, add or change conductor, substation and other devices on their system. In that guide it states "Primary conductors are not to be loaded for long periods of time, over 60% of operating capacity for summer loading conditions and 75% for winter." The 1.3 miles of 394 AAAC noted above exceeded the SDOC summer guideline in 2014 at 63% loaded. The SDOC serves as a guide and this was close, but we (CHELCO and I) decided it would be wise to do this project because the conductor feeding this 394 AAAC is already 741 AAAC and for only another 1.3 miles, they could upgrade to 741 AAAC to where the circuit splits. Doing this would remove the "weak link" which is the 394 AAAC.

Q. DO YOU KNOW IF CHELCO HAS PROJECT 300-RU10-01 IN THEIR SYSTEM UPGRADE PLANS?

A. Yes, the project is scheduled for the year 2014.

Q. IS THIS RECOMMENDATION IN THE CWP WITH RESPECT TO THE PROJECT YOU IDENTIFY TO SERVE PROJECTED GROWTH OR FOR FREEDOM WALK?

A. The project was for projected load growth using normal growths per the 2009 Load Forecast. It was not for Freedom Walk.

Q. DO YOU HAVE AN EXHIBIT OF THE CWP YOU REFERENCE?

A. Yes. Exhibit JNS-1 is an extract of pages from the CWP that pertain to the Auburn and Laurel Hill substations.

Q. IN ADDITION TO THE CWP, WERE YOU REQUESTED TO PROVIDE AN ANALYSIS AND RECOMMENDATION AS A RESULT OF THE ADDITION OF FREEDOM WALK?

A. Yes, but not at the same time. CHELCO contacted me about 2 months after I completed their CWP to do an analysis for Freedom Walk development.

Q. COULD YOU EXPLAIN HOW YOU CONDUCTED THIS STUDY

A. I used CHELCO's SDOC and their electric models (6 in all) from their 2011-2014 CWP to complete the study.

The SDOC is the same SDOC that I used in the CWP (that I discussed in the preceding question).

The 6 models from that CWP are explained as follows and are also discussed on the spreadsheet (page 2 of exhibit JNS-2, rows 1 and 2):

1) Two of the models were the peak summer 2009 and peak winter 2009 models that CHELCO provided to me at the end of 2009. These served as my base models for the CWP since they were true system peak models of how CHELCO's system look at that time.
2) I grew those models to the 2014 load level year per the 2009 Load Forecast that PowerSouth EC (CHELCO's generation and transmission provider) completes for all of their electric distributors. I saved those grown models as peak summer 2014 before system improvements (BSI) and peak winter 2014 BSI.

3) The last two models are peak summer and peak winter 2014 after system improvements (ASI). These ASI models are how the system will look in 2014 after all projects in CHELCO's 2011-2014 CWP are completed.

Next, I added the Freedom Walk development load of 3,700kW to each of the 6 models (refer to the 3rd row of the spreadsheet (page 2 of exhibit JNS-3)). Row 4 of that same spreadsheet shows my recommendations as a result of adding the load for the Freedom Walk development. Row 5 provides the engineering data (amps and kW loading) once those recommendations on Row 4 are completed.

On February 1, 2011, I ran another study on those same 6 models using 4.700 kW of load for Freedom Walk. I created a spreadsheet similar to JNS-3 named "Freedom Walk analysis 4700kW.xlsx" that details the results of this new study.

Q. WHAT ENGINEERING DATA DID YOU USE TO MODEL THE FREEDOM WALK DEVELOPMENT?

A. CHELCO provided me general information about the development and that the development would have an estimate of 3,700 kW at full build out. In all 6 models discussed previously I added a 3,700kW spot load at CHELCO's existing 3-phase line at the intersection of Roberts Avenue and Old Bethel Road. This existing 3-phase line is south of Auburn Substation and is on circuit 03, fed from Auburn Substation.

Here recently, CHELCO asked that I do another evaluation using 4,700 kW at full build out, which I have done.

Q. CWP PROJECT 300-RU10-01 IS A RECOMMENDED UPGRADE OF FACILITIES TO SERVE PROJECTED GROWTH. WOULD CHELCO NEED TO ADD ANY OTHER EQUIPMENT OR DO ANY OTHER UPGRADES TO THE SYSTEM IN ADDITION TO THOSE ALREADY PLANNED IN ORDER TO SERVE THE PROJECTED LOAD?

A. Using 3,700 kW for Freedom Walk, CHELCO might need to add additional capacitors and/or voltage regulators, but that would fall under standard operation and maintenance.

Using 4,700 kW for Freedom Walk, in the year 2014, it is projected that CHELCO would reach maximum rating on the power transformer at Auburn sub for their summer load and come very close to maximum rating for their winter load. Also, Auburn circuit 03 (which would feed Freedom Walk) breaker and lowside buswork would approach its maximum rating of 600 A in 2014. For CHELCO to serve this 4,700 kW load in 2014, they would need to upgrade the transformer at Auburn substation or add a 2nd bank or add a new delivery point to relieve the load on Auburn sub. If they chose to upgrade the existing transformer or add a 2nd bank, then they would also need add another circuit to help feed the load south of Auburn substation.

Q. HAVE YOU PREPARED AN EXHIBIT OF THESE STUDIES?

A. Yes. Exhibit JNS-3 is a copy of the updated study dated July 7, 2010 and JNS-4 is a copy of the most recent study.

Q. WOULD THERE BE ANY REDUCTION IN THE QUALITY OF SERVICE TO OTHER MEMBERS IF CHELCO WERE TO SERVE THIS LOAD?

A. Using the 3,700 kW load, the answer is NO, not once CWP project 300-RU10-01 is completed and capacitor recommendations for Auburn circuit 03 are completed. There may be voltage drop in the winter that is below the SDOC requirements, but that can and will occur anywhere on their system. If CHELCO completes the capacitor recommendations for Auburn Substation circuit 03, that will help address voltage drop. Also, it's normal practice to install a set of voltage regulators on the line to boost the voltage if necessary; CHELCO presently has voltage regulators throughout their system.

Using the 4,700 kW load, the answer is still NO. CHELCO would just have to add more system capacity (i.e. larger transformer at Auburn, 2nd transformer or new delivery point) and possibly add another circuit out of Auburn to help feed the load south of the sub (if they choose to upgrade Auburn substation instead of add a new delivery point). (Refer to JNS-4 for more detailed explanation). With such improvements, CHELCO is fully capable of serving this new load without reducing the quality of service to other customers.

Q. IS CHELCO'S SYSTEM CAPABLE OF SERVING THE LOAD AT FULL BUILD OUT OF THE DEVELOPMENT?

A. Using the 3,700 kW load, the answer is YES, once CWP project 300-RU10-01 is completed and capacitor recommendations in the CWP are completed for Auburn Substation circuit 03.

CHELCO will also need to switch some load from Auburn Substation to Laurel Hill Substation. They can switch approximately 1,050 kW of load to Laurel Hill by moving the existing open point between Auburn circuit 01 and Laurel Hill circuit 03 (along Hwy 85) to the intersection of Hwy 85 & Georgia Rd. . Switching load between substations is typical for CHELCO as they have switched load between substations at other locations on their system. After this load swap, CHELCO will need to install voltage regulators on the Laurel Hill circuit 03 near the intersection of Hwy 85 and Campton St.

Using the 4,700 kW load; the answer is still YES. CHELCO would just have to upgrade their system more to meet the needs. Upgrades as mentioned in the previous question.

Q. COULD YOU SUMMARIZE YOUR RECOMMENDATIONS FOR CHELCO TO SERVE THE LOAD ASSOCIATED WITH THE FREEDOM WALK DEVELOPMENT?

A. Using 3,700 kW for Freedom Walk

1) Complete CWP project 300-RU10-01 in 2011 instead of 2014.

2) Complete CWP capacitor placement recommendations for Auburn circuit 03 in 2011.

3) Switch approximately 1,050 kW of load along Hwy 85 from Auburn Sub circuit 01 to Laurel Hill Sub circuit 03 (making new open point near the intersection of Hwy 85 & Georgia Rd). This switching does not need to be done until Freedom Walk development begins to reach its full capacity. CHELCO

and PowerSouth EC will simply monitor the load on Auburn Substation (as they do on all their subs) and decide when best to switch this load.

4) After this load swap, install a set of voltage regulators at the intersection of Hwy 85 & Campton St.

Using 4,700 kW for Freedom Walk (refer to JNS-3)

1) Complete CWP project 300-RU10-01 in 2011 instead of 2014.

2) Complete CWP capacitor placement recommendations for Auburn circuit 03 in 2011.

3) Switch approximately 1,255 kW of load along Hwy 85 from Auburn Sub circuit 01 and 02 to Laurel Hill Sub circuit 03.

4) After this load swap, install a set of voltage regulators at the intersection of Senterfitt Rd & Springcreek Dr.

5) Add additional system capacity to the area (i.ee, upgraded power transformer at Auburn sub or add a 2nd bank, or add a new delivery point)

6) If a 2nd bank is added at Auburn sub or the transformer is upgraded, then add another circuit that feeds south of the substation. This will relieve the loading on Auburn circuit 03, the circuit breaker and the lowside buswork.

7) Additional capacitors and/or voltage regulators may need to be added, but can be evaluated later.

Q. **DOES THIS CONLUDE YOUR DIRECT TESTIMONY?**

A. Yes.

PATTERSON & DEWAR ENGINEERS, INC.

JACQUELYN NICOLE MABE, P.E.

EDUCATION

Bachelor of Science in Electrical Engineering, May 1994
UNIVERSITY OF SOUTH CAROLINA, Columbia, SC

PROFESSIONAL EMPLOYMENT

PATTERSON & DEWAR ENGINEERS, INC.
Norcross, GA
2007 ~ present

Project Engineer, Distribution Planning: Responsibilities include electric utility system studies, protective device coordination, short circuit studies, load flow studies, planning studies and distribution system design planning, regulator and capacitor placement studies, arc hazard assessments, cost of service studies and client support.

SOUTH CAROLINA ELECTRIC& GAS CO.
Columbia, SC
1997 ~ 2007

Engineer & Supervisor, Electric Meter Support: Provided technical support to the electric meter technicians which included troubleshooting meter problems, meter software support, training, and computer support. Researched and tested new metering products, both hardware and software, for all major meter manufacturers. Developed and maintained Microsoft Access databases and served as the backup operator for MV90 billing translation software.

SANTEE COOPER
Myrtle Beach, SC
1995 ~ 1997

Associate Engineer, Distribution Planning: Responsible for the distribution planning for Myrtle Beach which included planning studies, contingency studies, overcurrent protection coordination, feeder load balancing, relay and voltage regulator settings, issuing and approving switching orders and transformer load management. Provided technical assistance to design engineers and line technicians and assisted distribution controllers during storm restoration.

SANTEE COOPER
Myrtle Beach, SC
1994 ~ 1995

Assistant Engineer, Project Support: Responsible for graphically updating electrical distribution information system (EDIS) and performing field checks of the system.

REGISTRATION

Registered Professional Engineer in the states of South Carolina, Alabama, Georgia, Florida, Kentucky and Tennessee.

ORGANIZATIONS

Member IEEE, Industry Applications and Power Engineering Societies

CHOCTAWHATCHEE ELECTRIC COOPERATIVE, INC.

FLORIDA 30
DEFUNIAK SPRINGS, FLORIDA

2011-2014 CONSTRUCTION WORK PLAN

May 2010

Prepared by:

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TABLE OF CONTENTS

TABLE OF CONTENTS

EXHIBITS

CHOCTAWHATCHEE ELECTRIC COOPERATIVE, INC.

FLORIDA 30
DEFUNIAK SPRINGS, FLORIDA

CONSTRUCTION WORK PLAN (CWP)
January 1, 2011 – December 31, 2014

ENGINEERING CERTIFICATION

Upon completion of the construction proposed herein, the above indicated electric distribution system can provide adequate and dependable service to approximately 49,500 consumers with the residential consumers using an average of 1,222 kilowatt-hours per month. The most probable winter peak demand is estimated to be approximately 219,000 kW in the year 2014. The most probable 2014 summer peak is projected at approximately 211,000 kW.

The loads estimated for the next four years are consistent with the 2009 Load Forecast when including the two large power loads as discussed herein.

I certify that this 2011-2014 Construction Work Plan was prepared by me or under my direct supervision, and that I am a duly registered professional engineer under the laws of the State of Florida.

Patterson & Dewar Engineers, Inc.

Jacquelyn Nicole Mabe
Florida P.E. No. 68589

FLORIDA COOPERATIVES

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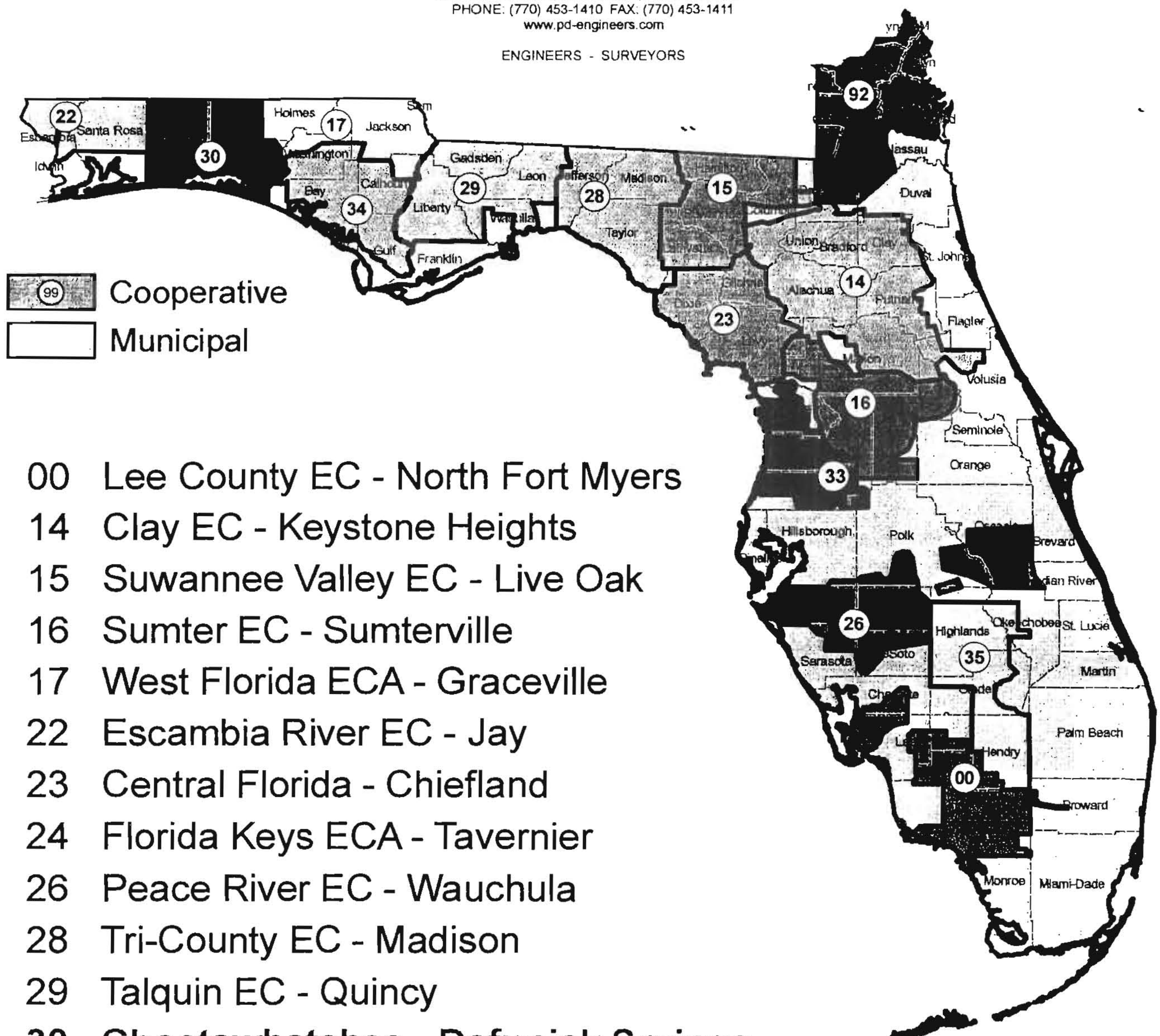
ENGINEERS - SURVEYORS



00 Lee County EC - North Fort Myers
14 Clay EC - Keystone Heights
15 Suwannee Valley EC - Live Oak
16 Sumter EC - Sumterville
17 West Florida ECA - Graceville
22 Escambia River EC - Jay
23 Central Florida - Chiefland
24 Florida Keys ECA - Tavernier
26 Peace River EC - Wauchula
28 Tri-County EC - Madison
29 Talquin EC - Quincy
30 Choctawhatchee - Defuniak Springs
33 Withlacoochee River EC - Dade City
34 Gulf Coast EC - Wewahitchka
35 Glades EC - Moore Haven

Choctawhatchee Electric Cooperative, Inc.
Florida 30
DeFuniak Springs, Florida

2011-2014 CONSTRUCTION WORK PLAN

May 2010

I. EXECUTIVE SUMMARY

A. Purpose, Results and General Basis of Study

This report documents the summer 2009 engineering analysis of, and summarizes the proposed construction for Choctawhatchee Electric Cooperative, Inc. (CHELCO's) electric distribution system for the four-year period of January 1, 2011 through December 31, 2014.

The proposed construction program is to be financed by a supplemental lender. This report provides engineering support, in the form of descriptions, costs, and the justification of required new facilities.

Upon construction completion of the proposed facilities, the CHELCO distribution system will provide adequate and dependable service to approximately 49,500 consumers with the residential consumers using an average of 1,222 kWh per month.

The 2014 projected number of consumers is taken directly from the Cooperative's 2009 Load Forecast (LF). The 2009 LF is also used for the total peak system load. The summer most probable kW demand and the winter most probable kW demand are used for the distribution line loading conditions and evaluation of adequate substation capacity for the next four years. These loading levels were agreed to by CHELCO's engineering staff.

CHELCO's 2004 Long Range System Study (LRSS) was based on the 2004 LF. Comparing the 2004 LF to the most current 2009 LF, the annual load projections through 2023 are higher in the 2004 LF. The 2004 LF used CHELCO's historical growth that at that time was growing more quickly because of a stronger and faster growing economy. Economic growth has slowed considerably over the last few years (as shown in the 2009 LF) which has affected CHELCO's system growth and therefore many of the recommendations in the 2004 LRSS have been postponed.

An analysis of thermal loading, voltage drops, physical conditions and reliability, has been performed on all substations, distribution lines, and major equipment of the existing system subjected to the peak summer 2009 and winter 2008/09 conditions. CHELCO provided two system models one allocated with the summer peak 2009 loads and the other allocated with the peak winter 2008/09 loads. These existing system models have been grown to the projected summer peak 2014 loading and projected winter peak 2013/14 loading to develop two future system models. The projected future loadings for both models are in agreement with the 2009 LF. The basis of the system analysis is CHELCO's System Design and Operational Criteria (SDOC). The analysis, utilizing Milsoft Integrated Solution's Distribution Primary Analysis, Windmil® software, is presented for each loading condition and is included herein on CD.

The 2014 load projections indicate that the following power supply problems need to be addressed.

- Overloaded Black Creek substation
- Overloaded Santa Rosa Beach and Grayton Beach substations

The first point noted above is presently being addressed. PowerSouth EC will complete the construction of a new substation, Hammock Bay, by the first quarter of 2011. Once this substation is complete, this CWP calls for load from Black Creek and Freeport substation to be switched to Hammock Bay.

The second point above is addressed in this CWP.

B. Service Area, Distribution System and Power Supply

CHELCO's corporate office is located in DeFuniak Springs, FL. The cooperative provides electric service to a portion of the northwestern part of Florida. The service area encompasses most of Walton, the northern portion of Okaloosa, western Holmes and eastern Santa Rosa counties. Rural residential accounts make up the majority of CHELCO's system. CHELCO provides electric service to rural homes, villages, small commercial and industrial consumers.

The northern area generally consists of flatlands with slightly rolling hills and sandy farmland along small streams and tributaries. The chief sources of income are from Eglin Air Force Base, agriculture and agricultural products, forestry and forestry products. The southern area includes approximately 20 miles of coastline and frontage on Choctawhatchee Bay. This coastal area, referred to as "south of the bay," consists of resorts and condominiums and presently experiences steady growth.

The following data was taken from CHELCO's 2009 bills from PowerSouth EC and 2009 Cost Analysis (dated 2/3/2010):

Number of Consumers	=	42,571
kWh Purchased	=	773,939,660
kWh Sold	=	734,815,389
Maximum kW Demand[1]	=	200,136
Total Utility Plant	=	$143,846,953
Miles of Distribution	=	3,856
Consumers per Mile	=	11.04

The following data was taken from CHELCO's 2009 LF[2]:

Annual Load Factor	=	45.3%
kWh Losses	=	5.27%

Service is provided to CHELCO members through 19 delivery points.

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[1] CHELCO reached a new system peak on January 11, 2010 of 228,593 kW.

[2] Data shown is for year-end 2008 which was the most recent historical information available at the time the 2009 LF was completed.

PowerSouth Energy Cooperative (PowerSouth EC), CHELCO's power supplier, is an RUS financed generation and transmission cooperative with its office headquarters located in Andalusia, Alabama. As power supplier, PowerSouth EC accommodates all the generation and transmission requirements of CHELCO and other cooperatives located in South Alabama and the panhandle of West Florida. PowerSouth EC has contracts with Gulf Power Company (GPC) for five of CHELCO's current delivery points; Santa Rosa Beach, South Walton, Grayton Beach, Eastern Lake and Holt. These five substations at these off site delivery points are owned by PowerSouth EC. This implies that PowerSouth EC has full responsibility for the substations when the source requires extensive modification or uprating **except** for the feeder reclosers, the associated isolating switches and capacitor racks. CHELCO owns these devices.

CHELCO takes delivery from PowerSouth EC at a distribution voltage level of 12,470 Volts, grounded-wye.

C. System Organization and Operation

CHELCO's headquarters is located in DeFuniak Springs, Florida, in the central part of their electric system. All engineering and management decisions come through this office. The system is operated and maintained under the leadership of the Vice President of Engineering and Vice President of Operations. An additional support staff of engineers, technicians, linemen, administrators and aides compliments the system operations.

District offices are maintained at Auburn, Bluewater Bay, Baker, Freeport and Santa Rosa Beach. These offices serve as local consumer service centers for new services and bill collections.

CHELCO Services Inc. is a subsidiary, for profit, contract company that does work for CHELCO. P&D performs regular work order inspections for CHELCO.

D. Summary of Construction Program and Costs

This work plan presents the costs of the recommended construction program over the next four years. The annual cost itemization is as follows:

2011	$7,772,074
2012	$7,562,622
2013	$8,208,099
2014	$8,517,851
Total	$32,060,645

By comparison, the annual totals for distribution plant additions and replacements during the four previous years[3] are as follows:

2006	$6,684,924
2007	$11,104,158
2008	$7,063,122
2009	$6,061,101

Four-Year Average = $7,728,326

A further breakdown of the construction program cost is summarized as follows:

	New Construction	System Improvements
2011	$3,388,323	$4,383,751
2012	$3,959,728	$3,602,894
2013	$4,720,977	$3,487,122
2014	$3,778,934	$4,738,917
Subtotal =	$15,847,962	$16,212,684

Total = $32,060,645

The total amount above is subject to loan funds. Each item recommended was reviewed with engineering and management staff prior to inclusion in this CWP. Approximately 49% of the capital required in the CWP is needed for new services and approximately 51% is for system improvements.

System losses for 2008 were 5.27% which is reasonable for an electric system of CHELCO's size and geographical scope. These losses are valued at approximately 40,958,000 kilowatt-hours or $1,975,404 based on an average wholesale kilowatt-hour cost of $0.04823.

The system improvements recommended in this CWP are estimated to reduce the primary line losses by approximately $179,000 per year (e.g. $721,500 for future system **without** improvements versus $542,500 for future system **with** improvements). This is if the projected most probable summer 2014 peak conditions are served.

[3] Data provided by CHELCO. 2010 data is not available at the time of this writing, so data from 2006-2009 is used.

II. BASIS OF STUDY AND PROPOSED CONSTRUCTION

A. Design and Operational Criteria

Exhibit K presents CHELCO's System Design and Operational Criteria (SDOC). On January 12, 2010, CHELCO reviewed and concurred with the criteria. The proposed construction as outlined in the 2010 CWP is necessary for meeting the minimum standards set forth in the SDOC.

The criteria presented herein is for use in design and operational guidelines only. System conditions may result in a breach of a specific criterion. Such occurrences are considered only temporary and not for long term operations.

B. Equipment Cost Estimates

Exhibit B presents the projected unit cost averages for new services and new construction. The estimates were provided by CHELCO and were based on their 2010 cost estimates. These cost estimates are grown 2.54% per year for years 2011 through 2014. The 2.54% is the average of the years 2001 through 2009 from the "US Department of Labor, Bureau of Labor Statistics, CPI for All Urban Consumers".

C. Analysis of Current System Studies

1. 2009 Load Forecast (LF)

A new 2009 Load Forecast (LF) was approved in July 2009. The study was prepared by PowerSouth EC in cooperation with CHELCO. The study utilizes statistical modeling techniques and reflects moderate growth patterns for future system conditions through 2028.

The LF offers three (3) projection scenarios for planning purposes and they are as follow:

Scenario 1 - Most Probable
Scenario 2 - Mild Weather
Scenario 3 - Extreme Weather

The 2009 LF does not include Emerald Coast Middle School that is to be added in 2010 with a load of 3 MW. Also not included in the 2009 LF is Mossyhead Industrial Park and Water Treatment Plant scheduled for 2011 with a load of 500 kVA.

For this work plan, Scenario 1 is utilized for both the four-year system distribution line conditions and for determining the improvements needed for substation capacity.

The 2009 LF projects the 2014 system summer conditions to have approximately 49,416 consumers creating a summer system peak demand of 207,451 kW. The summer system is projected to have an annual load factor of 48.9%.

For the 2014 system winter conditions, the 2009 LF projects approximately 49,416 consumers creating a winter system peak demand of 216,760 kW and an annual load factor of 46.8%.

2. 2004 Long Range System Study (LRSS)

R. W. Beck completed CHELCO's most recent LRSS in 2004. The LRSS was based on the 2004 LF. Comparing the 2004 LF, 2009 LF and actual peak data:

	Summer (NCP kW)			Winter (NCP kW)		
Year	2004 LF	2009 LF	Actual Peak	2004 LF	2009 LF	Actual Peak
2005	170,460		174,120	181,190		166,860
2006	177,980		181,990	189,170		168,800
2007	186,140		188,320	197,850		185,140
2008	193,850		183,240	206,040		203,030
2009	202,400	185,380		215,140		201,010
2010	210,580	189,470		223,830	197,970	229,263
2011	218,470	194,120		232,210	202,830	
2012	226,870	198,050		241,140	206,940	
2013	235,100	202,630		249,880	211,730	
2014	243,210	207,450		258,510	216,760	

Comparing the 2004 LF to the 2009 LF, it is clear that the 2009 LF has dropped for both summer and winter projections. Further comparing the actual peak kW to the 2004 LF shows that the actual winter peak is consistently less than the projected winter peak with the exception of the 2010 peak. For the summer, the 2004 LF and actual peak are close until 2008. The actual summer 2008 system peak is less than the 2004 LF.

The LRSS detailed the addition of three new distribution substations, two of which will be included in this CWP; Seagrove Substation in 2006, West Hewett Substation in 2009 and Dorcas Substation in 2013. In this CWP, Pt. Washington (referred to as Seagrove Substation in the 2004 LRSS) is recommended to be energized in 2013, Hewett Substation (referred to as West Hewett in the 2004 LRSS) is called for in 2012. Dorcas Substation is not recommended during the CWP's 2011-2014 planning period.

In summary, due to changes in the load forecasts from 2004 to 2009, the CWP primarily is based on the 2009 LF with consideration given to the recommendations in the 2004 LRSS. This explains the reason for delaying the substations, as noted above.

D. Historical and Projected System Data

1. Annual Consumer, Load and Losses Data

Exhibit A tabulates the annual system data for consumers, system peak demand, losses, and annual load factor. The exhibit provides both data and graphs for the actual conditions for 1993 through 2008 and for the projected years of 2009 through 2028.

The distribution system exhibits a growth in winter peak demand from 90,030 kW in 1993 to 200,136 kW in 2009. This represents approximately a 5.12% per year growth rate. The summer peak grew from 92,758 kW in 1993 to 182,401 kW in 2008 (an approximately 4.61% per year growth rate for the 16 year period).

The system is experiencing an annual 3.7% growth in consumers. There were 23,897 consumers in 1993, increasing to 42,747 in 2008. The 2014 projection is approximately 49,500 total consumers.

The annual distribution non-coincident peak (NCP) load factor was 45.3% for 2009. CHELCO's distribution load factor has ranged from a low of 37.3% to a high of 48.9% over the past twenty years depending on the severity of the summer and winter peaks. A 48.9% load factor is used in the LF most probable summer and a 46.8% load factor is used for the most probable winter. Though typically all of CHELCO's system is winter peaking with the exception of their system that serves the coastal area known as "south of the bay," which is typically summer peaking, it was agreed upon by CHELCO's engineering staff to use the summer most probable LF for the following reasons:

- The winter peaks experienced by CHELCO are usually short in duration, lasting no more than a few days.
- Problems experienced during such a peak can be handled reasonably well by CHELCO's staff with the use of line voltage regulators.
- System design for such a load level requires less system improvement capital than the projected most probable winter conditions, enabling CHELCO to be more competitive with neighboring electric distributors.

Substation upgrade recommendations to PowerSouth EC are based on both the most probable summer <u>and</u> winter conditions projected in the current Load Forecast. This policy was decided as substation construction and upratings usually take 18 to 24 months to complete, requiring extensive budgetary arrangements and planning.

The annual distribution system losses were 5.27% for 2008 and 5.06% for 2009. System improvements included herein should contribute significantly to reducing system losses.

2. Special Loads

Special loads included in the plan are Emerald Coast Middle school, scheduled for 2010 and Mossyhead Industrial Park & Water Treatment Plant, scheduled for 2011. Both of these new loads will be located in CHELCO's service territory.

There are two more special loads that should be noted. The new Panama City-Bay County International Airport, located east of CHELCO's electric system, is scheduled to be open in May 2010. The other is additional military presence with the 7th Special Forces and Joint Strike Fighters scheduled for 2011. Any load that may result from the new airport and the 7th Special Forces and Joint Strike Fighters is not included in this CWP because the impact each will have on CHELCO's service territory is uncertain at this time.

3. Substation Load Data

Exhibit N summarizes the substation loading and capacities for both existing summer 2009 as well as winter 2008/2009 system peak conditions. The projected future conditions both with and without the recommended system improvements are presented for the most probable summer 2014 and winter 2013/14 system peak conditions. The exhibit identifies each substation, winding capacity, percent of full load, percent power factor, and total peak demand. The loading is given in percent of full load rating of the substation transformer as provided by PowerSouth EC.

All substations are owned and operated by PowerSouth EC. PowerSouth EC bills CHELCO at each substation by kVA demand resulting in a penalty cost to CHELCO if near unity power factor is not maintained. With such a strong incentive, CHELCO tries to maintain unity power factor by using capacitors on its system.

CHELCO's SDOC allows for loading a substation power transformer to 100% for the summer conditions and 124% for the winter. When these levels are reached, plans should be commenced for handling the overloaded conditions.

For the peak summer 2009 conditions, no substations exceed 100% loading; however, Grayton Beach comes close at 93.5% loaded.

For the proposed summer 2014 peak conditions, two substations exceed the 100% loading level. The two subs are Grayton Beach at 119.6% (which includes the new Emerald Coast Middle School load) and Santa Rosa Beach at 107.4%. Eastern Lake Substation, though not projected to be overloaded in 2014, has an estimated loading of 93.4%. A new delivery point, Hewett Substation, being called for in this CWP, will relieve the loading on Santa Rosa Beach. To lessen the loading on Grayton Beach and Eastern Lake subs, a new delivery point, Pt. Washington, is called for in this CWP.

For the peak winter 2008/09 conditions no substation exceeds the 124% loading limit. However, CHELCO reached a new system peak in January 2010 and Black Creek Substation did exceed the 124% loading limit with a loading of 125.7%. In fact, the individual substation loadings for winter 2010 exceeds all but three of the proposed winter 2013/14 substation projections.

For the proposed winter 2013/14 peak conditions, no substations exceed the 124% loading level; however, Black Creek substation comes close to its limit at 117.7 % and as stated above, has already exceeded its limit in January 2010. PowerSouth EC is presently adding a new delivery point, Hammock Bay, that will relieve the loading on Black Creek. It's estimated to be energized the first quarter of 2011.

Specific recommendations concerning substations are presented in Exhibit G.

4. Circuit Loading and Voltage Conditions

The 2009 summer non-coincidental substation peaks along with the corresponding kWh consumer billing data for each substation was used to develop the summer system model. Likewise, the 2008/2009 winter non-coincidental substation peaks and corresponding kWh consumer billing data for those substations was used in the winter system model. These two models represent the base existing system for this CWP. For both models, the system serves approximately 42,747 consumers with each residential consumer averaging 1,199 kilowatt-hours monthly.

In anticipation of future system loading conditions, line voltage regulators and capacitor changes will be necessary to maintain adequate voltage. Those select areas are listed in detail in Exhibits H & I.

5. System Outages and Reliability

CHELCO maintains daily outage reports and prepares monthly and annual summaries. Exhibit L presents a summary of the consumer outage hours for the five previous years. The five year consumer outage average is 5.40 hours per consumer per year. This average is due much in part to Hurricane Dennis in 2005. Excluding Hurricane Dennis, the five year consumer outage average is 2.26 hours per consumer per year.

III. REQUIRED CONSTRUCTION ITEMS

A. Service to New Consumers

Using 2010 budget estimates, CHELCO estimates installing 286 overhead services per year for new consumers at an average cost of $1,658 per service. CHELCO estimates installing 532 underground services per year for new consumers at an average cost of $2,802 per installation. Extending the overhead and underground costs on a per unit basis, and using the per year cost increase of 2.54%, it is estimated that over the next four years $8,371,319 in capital will be required to construct the new services. This calculates to be an average of $2,092,830 per year.

Exhibit B summarizes the projected cost estimates for the new services. Transformer, poles, and outdoor light quantities and costs are also given in this exhibit. Exhibit D summarizes the costs on an annual basis. Approximately 49% of the capital required for this work plan is estimated to be for new consumer services.

B. Service Changes to Existing Customers

Using 2010 budget estimates of $186,282 grown 2.54% per year, CHELCO expects a capital requirement of $793,661 for the CWP period.

C. Work Plans - Additions and Changes

The recommended CWP line changes and improvements are generally for the following reasons:

Excessive Voltage Drops
Excessive Load Currents (or Overloaded Lines)
Poor Service Reliability

Increasing conductor size, increasing the number of phases, reducing distances of feeds, and installing voltage regulators and capacitors are the methods of correction for excessive voltage drops. Excessive load current is an undesirable situation normally corrected by the same methods used for excessive voltage drops; however, the improvement is recommended in most cases to assure proper coordination of line reclosers or sectionalizing devices.

Right-of-way clearing often results in improved service reliability. However, if specific line components are causing outages, then priority is given to rebuilding the line to replace old and worn-out equipment. Rebuilding a line may include conductor, pole or crossarm replacement, replacing defective insulators, etc. Also the construction of tie lines may improve service reliability. Tie lines shorten the circuit feed distance thereby reducing line exposure and also providing loop feed capability. The loop feed capability is very beneficial during outages and line maintenance.

Reviewing the summer 2009 primary analysis and considering the load growth estimates of the peak summer and winter system 2014; the four year CWP work plan estimate for code 300 work plans is $5,180,195 including line conversions and changes.

Each recommendation of the CWP has been reviewed with CHELCO's engineering and management staff prior to inclusion in this report. Exhibit F presents a summary of the work plan distribution line construction recommendations.

Please note the following explanation for the construction reference numbers for accounting code 300:

XXX-XXYY-ZZ	=	Construction Item Number
XXX-XX	=	Accounting Code
YY	=	CHELCO Substation Number
ZZ	=	Consecutive Number Under Each Substation

Exhibit F also presents construction justification codes for each recommendation. Quantitative information regarding the system benefits of each code 300 construction item is presented in Exhibit Q. This information can also be found in the summer and winter Milsoft models used in this CWP that are included herein on CD.

D. Substation - Additions and Changes

The SDOC, Exhibit K, establishes that a substation's projected future loading condition is not to exceed 100% of its full nameplate kVA capacity in the summer and 124% of its full nameplate kVA capacity during the winter without planning its uprating. A review of the substation summer loading conditions in Exhibit N without improvements reveals that two substations, Grayton Beach and Santa Rosa Beach, are projected to exceed these maximum summer loading levels in the next four years. Referring to Exhibit N – winter, the substation conditions show that though none of the substations in the 2014 projected loads without improvements, exceed the SDOC winter loading of 124% of full nameplate, the actual 2010 winter peak did exceed the maximum winter loading level for one substation, Black Creek. CHELCO reached a new system peak in January 2010. Substation peaks for winter 2010 exceed the 2014 LF projections for all of CHELCO's substations except Auburn, Mossyhead and Grayton Beach (see Exhibit N – winter).

Exhibit G documents the need for two substations that are called for in this CWP; Hewett and Pt. Washington substations. Both substations are necessary in order to relieve the loading on neighboring substations. The addition of these two new substations will also relieve overloaded conductor, reduce voltage drop and reduce kW losses.

While coordinating CHELCO's CWP needs with PowerSouth EC, the following system transmission line and power supply needs are identified:

- Tap the Bluewater Bay to Santa Rosa Beach Gulf Power 115 kV transmission line for a new 12.5 kV delivery point, Hewett substation.

- Build approximately 1.8 miles of 115 kV transmission line to a new 12.5 kV delivery point, Pt. Washington substation, by tapping the Grayton Beach to Eastern Lake Gulf Power 115 kV line.

E. Line Regulators - Additions and Changes

Exhibit H itemizes the location of the new regulators and CHELCO is recommended to add the regulators only as system problems are field measured and verified. Several regulators are recommended to be installed and removed to maintain adequate system voltage. Only seven 36.1 kVA (50 Amp) single phase regulators will need to be purchased during this work plan due to the reuse of existing regulators at new locations. The CWP total cost estimate for voltage regulators is $59,221, which includes labor.

F. Capacitor Equipment - Additions and Changes

All capacitor recommendations are based on the computer output of the Windmil® software of Milsoft Integrated Solutions, Inc. Capacitor locations and kVAR bank size recommendations are based on minimizing line loss. The capacitor recommendations can be found in Exhibit I. The cost of capacitor changes is also categorized by Code 604 and the cost estimate is $469,513, including labor.

G. Sectionalizing Equipment - Additions and Changes

A sectionalizing review was completed as part of the CWP. PowerSouth EC provided CHELCO's low-side source impedance data so that available fault currents at each substation and delivery point can be determined. A sectionalizing review, as opposed to a complete sectionalizing study, reviews the existing hydraulic and electronic reclosers and makes recommendations using the future 2014 system model, after the CWP recommended system improvements. These recommendations are based on the following criteria:

a. Maximum fault at device location exceeds device's maximum pickup rating
b. Minimum fault at device location is below device's minimum pickup rating
c. Load current at device location exceeds device's continuous current rating
d. Coordination[4]
e. Recommended line open change
f. Conversion from single phase to multi phase line

Sectionalizing cost estimates can be found in Exhibit J. The total cost included in the work plan, for Code 603-4, recloser replacement upgrade, is $329,828.

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[4] Coordination with fuses and upstream switchgear or substation relay equipment is not part of the sectionalizing review. Coordination as noted above is only with other reclosers and is done in part due to recommendations in the sectionalizing review. CHELCO's engineering staff should review coordination with all upline and downline devices prior to making any changes.

H. Ordinary Replacements

The physical condition of CHELCO's electric plant is satisfactory according to quarterly work order reviews by Patterson & Dewar Engineers. CHELCO uses Osmose to do their pole inspections. CHELCO is on an eight year cycle program and they are presently in their 4^{th} year.

Current estimates for pole replacements can be found in Exhibit B. Based on 2010 budget costs, the total CWP projected costs for pole replacements is $378,016, for unexpected replacements the cost estimate is $852,107 and for concrete pole upgrades the estimate is $63,908.

IV. CONCLUSION

The recommendations included in this CWP are moderate. CHELCO's management and engineering/operating personnel are encouraged to continue monitoring system conditions over the next four years, and when and if problems do arise, CWP amendments should be timely generated to assure system conditions are maintained in accordance with the SDOC specified.

The recommendations set forth in this construction work plan will enable CHELCO to serve the projected 2014 peak loading conditions. The construction recommendations are in accordance with economic criteria established by CHELCO's load forecast. Any questions or comments regarding this report should be directed to Nicole Mabe of Patterson & Dewar Engineers. Her email address is nmabe@pdengineers.com.

CHOCTAWHATCHEE ELECTRIC COOPERATIVE, INC.
Florida 30
DeFuniak Springs, Florida

2011-2014 CONSTRUCTION WORK PLAN (CWP)
Distribution Line Construction Recommendations and
Cost Estimates

Construction Justification Codes

1. Overload Single-Phase Line
2. Overload Multi-phase Line
3. Excessive Voltage Drop
4. Balance Phase Loading
5. Improve Service Reliability
6. New Feeders (New or Existing Sub)
7. New Load Development
8. Establish Main Tie Between Sub/Circuit
9. Highway Relocation Project

REF. NOS.	Nearest Device	Line Section	Miles	Existing Construction	Proposed Construction	Year 2011	2012	2013	2014	Construction Justification Code
Substation 1 - Laurel Hill										
none										

DOCKET NO. 100304-EU
EXHIBIT (JNS-2)
CONSTRUCTION WORK PLAN
PAGE 20 OF 44

REF. NOS.	Nearest Device	Line Section	Miles	Existing Construction	Proposed Construction	Year 2011	2012	2013	2014	Construction Justification Code
Substation 10 - Auburn										
300-RU10-01	10614S18	123563 to 122293	1.3	3Ø - 394 AAAC	3Ø - 740.8 AAAC				$227,404	2
200-10-01	10906S01	122498	0.2		1Ø - 2 AAAC				$12,663	1
Substation 11 - Bluewater Bay										

DOCKET NO. 100304-EU
EXHIBIT (JNS-2)
CONSTRUCTION WORK PLAN
PAGE 21 OF 44

CHOCTAWHATCHEE ELECTRIC COOPERATIVE, INC.
Florida 30
DeFuniak Springs, Florida

2011-2014 CONSTRUCTION WORK PLAN (CWP)

Voltage Regulator Recommendations and Cost Estimates
Code 604

Remarks

A - Overloaded
B - Improved Circuit Regulation
C - Excessive Voltage Drop
D - Unneeded
ASI - After System Improvements

Voltage Regulator Descriptions

kVA Rating	Amp Rating
38.1	50
76.2	100
114.3	150
167	219
250	328

Substation/Circuit	Device	Existing	2014 Summer Peak Current	2013/14 Winter Peak Current	Recommendations	Remarks
Substation 1 - Laurel Hill						
0104	REG01-01	-	21a	32a	Add 1-50a	C
0102	REG01-02	-	47a	66a	Add 1-150a	C

2011-2014 CONSTRUCTION WORK PLAN (CWP)
Voltage Regulator Recommendations and Cost Estimates
(Continued)

Substation/Circuit	Device	Existing	2014 Summer Peak Current	2013/14 Winter Peak Current	Recommendations	Remarks
Substation 10 - Auburn						
1002	REG028	1-219a	142a	198a	-	
1002	REG022	1-100a	31a	48a	-	
1002	REG10-01	-	22a	36a	Add 1-50a	C

CHOCTAWHATCHEE ELECTRIC COOPERATIVE, INC.
Florida 30
DeFuniak Springs, Florida

2011-2014 CONSTRUCTION WORK PLAN (CWP)
Capacitor Recommendations and Cost Estimates
Code 604

Substation	Device	Line Section	Existing	Recommendations
#1. Laurel Hill	CAP080	146377	300 F	Remove
	CAP072	125006	300 F	Replace w/ Switched
	CAP079	145523	300 F	-
	CAP01-01-F	125810	-	Add 300 Fixed
	CAP01-02-F	125459	-	Add 300 Fixed

2011-2014 CONSTRUCTION WORK PLAN (CWP)
Capacitor Recommendations and Cost Estimates (Continued)
Code 604

Substation	Device	Line Section	Existing	Recommendations
#10. Auburn	CAP97	123106	300 F	-
	CAP069	123590	300 F	Replace w/ Switched
	CAP093	123935	600 F	Replace w/ 300 Switched
	CAP029	122129	1200 F	Remove
	CAP068	123542	300 F	Remove
	CAP070	122675	300 F	-
	CAP015	123562	1200 F	Remove
	CAP071	131947	300 F	Remove
	CAP087	136487	600 F	Remove
	CAP10-01-F	123639	-	Add 300 Fixed
	CAP10-02-S	123175	-	Add 300 Switched
	CAP10-03-F	122377	-	Add 300 Fixed
	CAP10-04-S	122753	-	Add 300 Switched
	CAP10-05-F	123088	-	Add 300 Fixed
	CAP10-06-S	123100	-	Add 300 Switched
	CAP10-07-F	145005	-	Add 300 Fixed
	CAP10-08-F	123671	-	Add 300 Fixed
	CAP10-09-S	149868	-	Add 300 Switched
	CAP10-10-S	123804	-	Add 300 Switched
	CAP10-11-F	123806	-	Add 300 Fixed
	CAP10-12-S	149345	-	Add 300 Switched
	CAP10-13-F	123515	-	Add 300 Fixed
	CAP10-14-S	145330	-	Add 300 Switched
	CAP10-15-F	123507	-	Add 300 Fixed

CHOCTAWHATCHEE ELECTRIC COOPERATIVE, INC.
Florida 30
DeFuniak Springs, Florida

2011-2014 CONSTRUCTION WORK PLAN (CWP)
Sectionalizing Summary and Cost Estimates

Code 603-4

Remarks

1 - Maximum Fault
2 - Minimum Fault
3 - Load Current
4 - Min. Fault not protected by existing or proposed device
5 - Coordination
6- Change in Line Open
7 - Conversion to Multi-Phase
8- Projected 2014 continuous load exceeds existing or proposed device

			Existing		Device			2014 Cont.	2014 Fault Currents		Proposed		
Substation	Circuit	Model Ref. #	Ø	Device	Cont. Rating	Max. Amps	Min. Amps	Load Amps	Max. Amps	Min. Amps	Ø	Device	Remarks
Laurel Hill	0102	04906S06	1Ø	15 H	15	375	30	9	634	150	1Ø	25 4H	1
		04906S05	3Ø	35 H	35	875	70	46	772	118	3Ø	50 H	3, 5
		02911S04	1Ø	35 H	35	875	70	25	483	125		-	
		02802S01	1Ø	25 H	25	625	50	9	320	114		-	
		02815S01	1Ø	15 H	15	375	30	9	438	139	1Ø	25 H	1
		04919S03	1Ø	50 H	50	1250	100	25	548	122		-	
		08909S01	1Ø	25 H	25	625	50	9	310	116		-	
		04814S01	1Ø	50 H	50	1250	100	7	931	145		-	
		04714S03	3Ø	70-4H	70	2500	140	56	2147	143		-	
		04705S02	1Ø	35 H	35	875	70	40	980	144	1Ø	50 H	1, 3, 5
		02821S01	1Ø	15 H	15	375	30	12	813	140	1Ø	25 4H	1
		02722S02	1Ø	50 H	50	1250	100	39	647	139		-	
		02707S01	1Ø	35 H	35	875	70	33	484	121		-	
		00718S01	1Ø	15 H	15	375	30	10	343	114		-	
		04703S06	1Ø	15 H	15	375	30	2	697	145	1Ø	25 4H	1
	0103	06723S05	1Ø	15 H	15	375	30	8	754	152	1Ø	25 4H	1
		06723S06	1Ø	25 H	25	625	50	21	750	140	1Ø	25 4H	1
		06719S03	1Ø	50 H	50	1250	100	5	892	155		-	
		06714S01	1Ø	35 H	35	875	70	25	953	143	1Ø	35 4H	1
		04723S01	1Ø	50-L	50	3000	100	74	1653	147	1Ø	100 4H	3, 4
	0104	04613S05	1Ø	50 H	50	1250	100	24	1221	152	1Ø	70 4H	5
		02622S01	1Ø	25 H	25	625	50	20	692	125	1Ø	35 H	1, 5
		00619S01	1Ø	15 H	15	375	30	16	356	117	1Ø	25 H	3
		04511S06	1Ø	35 H	35	875	70	32	678	122		-	
		04320S01	1Ø	15 H	15	375	30	8	389	121	1Ø	15 4H	1
		04414S01	1Ø	15 H	15	375	30	12	527	128	1Ø	15 4H	1
		04511S07	3Ø	70-L	70	4200	140	70	811	128		-	4
		02304S04	1Ø	35 H	35	875	70	19	315	119		-	
		02305S03	1Ø	35 H	35	875	70	10	317	121		-	
		02403S03	1Ø	35 H	35	875	70	32	365	114		-	
		02515S02	1Ø	15 H	15	375	30	16	447	134	1Ø	25 H	1, 3
		02506S01	1Ø	35 H	35	875	70	15	451	129		-	
		02512S01	1Ø	35 H	35	875	70	37	495	124	1Ø	50 H	3
		02517S01	1Ø	15 H	15	375	30	13	514	138	1Ø	25 H	1
		04502S01	1Ø	25 H	25	625	50	20	614	133		-	
		04611S02	1Ø	70-4H	70	2500	140	32	1008	149		-	
		02621S02	1Ø	35 H	35	875	70	25	623	135		-	
		02506S02	1Ø	15 H	15	375	30	8	500	120	1Ø	15 4H	1
		04613S08	3Ø	70-4H	70	2500	140	14	1258	156		-	
		06606S01	1Ø	50 H	50	1250	100	26	693	138		-	
		06524S01	1Ø	15 H	15	375	30	13	466	132	1Ø	25 H	1

2011-2014 CONSTRUCTION WORK PLAN (CWP)
Sectionalizing Summary and Cost Estimates

(Continued)

			Existing		Device			2014			Proposed		
		Model			Cont.	Max.	Min.	Cont. Load	Fault Currents Max.	Fault Currents Min.			
Substation	**Circuit**	**Ref. #**	**Ø**	**Device**	**Rating**	**Amps**	**Amps**	**Amps**	**Amps**	**Amps**	**Ø**	**Device**	**Remarks**
Auburn	1001	08717S12	3Ø	NOVA	630	12500	140	65	3153	173		-	
		10704S07	vØ	100-4H	100	2500	200	48	1820	158		-	4
		08707S03	1Ø	35 H	35	875	70	22	1784	160	1Ø	35 L	1
		08707S06	3Ø	70-L	70	4200	140	43	2402	158		-	
		08610S07	1Ø	25 H	25	625	50	5	1276	161	1Ø	25 L	1
		08603S02	1Ø	35 H	35	875	70	40	902	143	1Ø	50 H	1, 3
		06614S02	1Ø	15 H	15	375	30	13	539	129	1Ø	25 H	1
		06614S01	1Ø	15 H	15	375	30	3	539	136	1Ø	25 H	1
		08604S04	1Ø	25-L	25	1500	50	14	973	157		-	
		08722S02	1Ø	70-L	70	4200	140	17	3751	173		-	
		08722S07	1Ø	70-L	70	4200	140	58	4108	171		-	

2011-2014 CONSTRUCTION WORK PLAN (CWP)
Sectionalizing Summary and Cost Estimates

(Continued)

					Device			2014					
		Model	Existing		Cont.	Max.	Min.	Cont. Load	Fault Currents Max.	Min.	Proposed		
Substation	Circuit	Ref. #	Ø	Device	Rating	Amps	Amps	Amps	Amps	Amps	Ø	Device	Remarks
Auburn (cont.)	1002	10707S03	3Ø	50-L	50	3000	100	29	3927	171	3Ø	70 L	1
		10709S07	1Ø	70-L	70	4200	140	81	2083	166	1Ø	100 L	3, 4
		10811S07	3Ø	WE	560	10000	140	192	1849	152		-	
		10811S03	1Ø	70-4H	70	2500	140	45	1320	151		-	
		10906S01	1Ø	35 H	35	875	70	6	617	149		-	
		10913S02	1Ø	70-4H	70	2500	140	50	671	138		-	4
		08921S02	1Ø	35 H	35	875	70	8	440	129		-	
		10913S01	3Ø	100-4H	100	2500	200	32	918	148		-	4
		08919S01	1Ø	50 H	50	1250	100	22	539	146		-	
		10904S02	1Ø	50 H	50	1250	100	25	575	148		-	
		10918S02	1Ø	35 H	35	875	70	17	652	146		-	
		10918S01	1Ø	35 H	35	875	70	35	655	139	1Ø	50 H	3
		10814S04	1Ø	50 H	50	1250	100	59	947	150	1Ø	70 4H	3
		10813S01	1Ø	25 H	25	625	50	27	1004	150	1Ø	35 4H	1, 3
		10812S06	1Ø	50 H	50	1250	100	48	1258	162	1Ø	50 4H	1
		10705S01	1Ø	35-4H	35	1400	70	0	1883	174	1Ø	35 L	1
		10709S08	1Ø	70-L	70	4200	140	71	1966	169	1Ø	100 4H	3, 4
		10709S03	1Ø	35-L	35	2100	70	21	2014	170		-	
		10709S13	3Ø	70-L	70	4200	140	36	2756	171		-	
		10713S01	1Ø	35-L	35	2100	70	35	1715	169		-	
		10702S06	1Ø	50-L	50	3000	100	18	3746	176	1Ø	70 L	1
	1003	10615S12	3Ø	100-L	100	5000	200	162	2714	170	3Ø	VWE	2, 3, 5
		10621S01	3Ø	50-4H	50	2000	100	36	1653	169		-	
		10616S03	1Ø	35-L	35	2100	70	34	1101	157		-	
		10616S01	1Ø	25 H	25	625	50	22	1192	165	1Ø	25 L	1
		10618S01	1Ø	50 H	50	1250	100	80	1371	164	1Ø	100 4H	1, 3, 4
		10623S02	1Ø	15 H	15	375	30	11	1597	169	1Ø	35 L	1
		10615S16	3Ø	70-L	70	4200	140	9	2792	169		-	
		10614S18	3Ø	NOVA	630	12500	140	161	2792	166		-	
		10614S07	1Ø	50-L	50	3000	100	28	2106	170		-	
		10601S04	1Ø	15 H	15	375	30	11	1060	166	1Ø	25 L	1
		10601S05	1Ø	50-4H	50	2000	100	80	1064	160	1Ø	100 L	3, 4
		08621S09	1Ø	25 H	25	625	50	24	905	160	1Ø	25 4H	1
		08621S03	1Ø	25 H	25	625	50	15	905	156	1Ø	25 4H	1
		10603S05	3Ø	50-4H	50	2000	100	10	1690	168		-	
		10614S06	1Ø	50-L	50	3000	100	35	2046	168		-	
		10614S13	3Ø	50-L	50	3000	100	27	2756	170		-	
		10609S03	1Ø	25-L	25	1500	50	32	1755	170	1Ø	35 L	1, 3
		10701S02	1Ø	VXE	400	8000	150	41	4480	169		-	

CHOCTAWHATCHEE ELECTRIC COOPERATIVE, INC.
(CHELCO)
Florida 30
DeFuniak Springs, Florida

2011-2014 CONSTRUCTION WORK PLAN (CWP)
System Design and Operational Criteria

Each of the criteria items listed below were reviewed and concurred by CHELCO staff on January 12, 2010.

Construction proposed in this construction work plan (CWP) is required to meet the following minimum standards of adequacy for voltages, thermal loading, safety and reliability on the system. Note that references to future conditions imply the current CWP projections.

It is further understood that the criteria given herein is considered to be a guideline and not a mandate. Oftentimes system conditions will occur which may result in a breach of a specific criteria. Such a condition is considered to be only temporary and is not intended for long range operations.

SYSTEM DESIGN CRITERIA

Substations:

1. CHELCO's power supplier, PowerSouth Energy Cooperative (PowerSouth EC), has the primary responsibility for providing the substation transformer capacity including regulation. It is PowerSouth EC's responsibility to provide CHELCO the requested delivery voltage to CHELCO's low side switching structure for power distribution.

The following maximum loading conditions as a percent of the **full** equipment nameplate ratings based on CHELCO's extreme load forecasts, are recommended. When these levels are projected to be exceeded, plans for uprating are to be scheduled:

Power Transformers -	Summer loading – 100% continuous loading at 55° rating Winter loading – 124% continuous loading at 55° rating
Voltage Regulators -	Summer loading - 100% at the 10% buck or boost rating Winter loading – 124% at the 10% buck or boost rating (these loading recommendations could change depending on the voltage regulator rating)
Circuit Breakers and Reclosers -	Summer or winter - continuous rating = 100% Interrupting rating = 100%
Busses and Switches -	Summer or winter – continuous rating = 100%

2. All new substations and/or delivery points will be justified per the current Long Range System Study as well as power supply studies following the format required by power supplier.
3. CHELCO's power supplier shall provide firm spare substation power transformer capacity for each delivery point by way of a replacement bank having the proper high side and low side voltage levels. Mobile substations or transformers are not considered as firm spare transformer capacity and are considered as tools for emergency short term service .
4. Feeder current balance will be maintained at plus or minus 20% of the average per phase loading at peak conditions.
5. Substation feeder protection will be accomplished per the following criteria based on power transformer capacity:

   a) Phase pickup levels will be such to protect feeder conductors as well as to be approximately 1.5 times full load continuous current levels.

2011-2014 CONSTRUCTION WORK PLAN
System Design and Operational Criteria (continued)

SYSTEM DESIGN CRITERIA (continued)

Substations: (continued)

b) Ground pickup will be set to respond to the minimum downline calculated fault current level based on a 40 ohm high impedance primary fault.

c) The number of reclosings, intervals and reset times varies and should be addressed on a case by case basis.

6. New substation designs and construction from the high side transmission tap point to the low side regulated bus will be accomplished and paid for by CHELCO's power supplier, PowerSouth EC. The low side switching structure will be designed and constructed by CHELCO. The new low side structure will be constructed to include the following:

a. A structure that includes a transfer bus.
b. Three phase feeder reclosers will be used in lieu of feeder breakers when the available bus fault current is below 12,500 amperes or the load current is less than 800 amperes. Three phase breakers will be used in all other duty conditions that exceed the above indicated levels.
c. Feeder protection will utilize static or electronic means in lieu of electro-mechanical.
d. Outgoing phasing for the feeders will be A-B-C and consistent with PowerSouth EC's phasing of 1-2-3.
e. New substations with power transformers larger than 5.0 MVA will utilize feeder regulation. All others will utilize bus regulation.

Distribution Lines:

1. All new distribution lines are to be designed and built according to CHELCO's standard construction specifications and guidelines for the appropriate NESC loading district.
2. All new primary construction is to be overhead except where underground is required to comply with governmental or environmental regulations, local restrictions or favorable economics.
3. New lines and line conversions are to be built according to the standard primary voltage levels as recommended in the current Long Range System Study.
4. A minimum of #2 AAAC is to be used on main lines and tap lines.
5. Primary conductors are not to be loaded for long periods of time, over 60% of operating capacity for summer loading conditions and 75% for winter. Operating capacity is defined as the manufacturer's ratings at the conductor maximum operating temperature of 75°C (167°F), with 25°C (77°F) ambient and with 2 mph wind. Major tie lines between substations can be loaded to 100% to include backfeed.
6. The maximum voltage drop from the substation on primary distribution lines using a 120 V base is normally not to exceed 6 volts unregulated, 12 volts with one bank of line voltage regulators, and 18 volts with two banks of line voltage regulators. Ordinarily, lines will be limited to one bank of line regulators.
7. Single-phase taps will be multi-phased if conditions are present that meet all of the following criteria:
   a. Serve more than 60 consumers @ 12.47 kV.
   b. Have a projected future system load over 432 KW @ 12.47 kV (60 amps).
   c. The tap serves an area that is growing.

8. Primary lines are to be rebuilt if they are found to be unsafe or in violation (when constructed) of the National Electrical Safety Code or other applicable code clearances.

2011-2014 CONSTRUCTION WORK PLAN
System Design and Operational Criteria (continued)

SYSTEM DESIGN CRITERIA (continued)

Distribution Lines: (continued)

9. Poles and crossarms are to be replaced as soon as practicable if found to be physically deteriorated by inspection.
10. Conductors are to be replaced if AAAC has caused four or more outages in a given year. Similarly, if copper conductor has become brittle and dangerous, and has caused at least four outages in a given year, the line will be replaced.

Distribution Line Equipment:

1. Distribution class MOV arresters and related pole grounds are to be installed a minimum of every 1320 feet of line.
2. Line voltage regulator projected future loading will be limited to 100% of nameplate rating at 10% buck or boost or 95% at 5% buck or boost.
3. Line sectionalizing devices (e.g. circuit reclosers - CR, sectionalizers, fuses, etc.) are to be applied per the following guidelines:

- No sectionalizing device will be located such that its rated nameplate maximum fault interrupting capacity is exceeded.
- The sectionalizing system shall be designed such that any 40 ohm primary fault will be detected, interrupted and isolated.
- Sectionalizing devices are to be loaded to no more than 100% of continuous nameplate conditions.
- CR to CR coordination is to be based on a required 3 cycle separation between lock-out curves at the maximum fault on the downline device or 12 cycles separation between lock-out curves, **if possible.**
- Line reclosers shall operate on the time current characteristics curves equivalent to the Cooper Power System's "2A2B".
- Line reclosers are to be maintained systematically based on the number of years since last maintenance. The number of years between maintenance is to be based on data compiled actual maintenance records and is determined for each recloser type.

****The following design criteria is presently under review****

4. Since wholesale power billing is on metered peak substation KVA, capacitor banks will be installed on distribution lines as required to maintain unity power factor at peak loading conditions. Capacitor switching will be utilized as required, to maintain off peak power factor to greater than 90% leading. Capacitors will be located based upon KW loss reduction.
5. Switched capacitors are to utililize controls that operate on temperature with a voltage override except for banks that are to support power factor correction on industrial and/or commercial loads. At those locations kVAR controls are to be used.

2011-2014 CONSTRUCTION WORK PLAN
System Design and Operational Criteria (continued)

SYSTEM DESIGN CRITERIA (continued)

Distribution Line Equipment: (continued)

When temperature controls with a voltage override are utilized, the following guidelines are to be applied (based on the Energyline IntelliCAP automatic controls that are used currently by CHELCO):

- The controls are to be pole-mounted such that they are on the northeast side of the pole, if at all possible. (Note: If such can not be accomplished, the temperature setting levels may have to be raised since the controls will be in direct sunlight a part of the day).
- Set the summer period for May through October and the winter period from November through April.
- Utilize the following ten degree Fahrenheit "on/off" temperature range setting for the seasons indicated:

Winter:	On - 30°F	Off - 40°F
Summer:	On - 85°F	Off - 75°F

Note: It is recommended that for **each** substation service area that:

1. Bank switching be staggered by varying the temperature on and off settings by 5°F, if possible, or 3°F otherwise.
2. Capacitor banks located on the heaviest loaded feeder and located fartherest from the sub, should be set to come on first.
3. A fixed level of capacitors be established for each season, winter and summer, rather than have all banks switched. This may require some banks to be manually switched on and off during a season.

- Set the data logging to the 30 minute intervals.
- Set the maximum automatic control cycles to four per day.
- Set the voltage override levels to 115 volts for banks to be switched on and 130 volts for banks to be switched off.
- When downloading data from a control, the physical location field should be completed to reflect a) substation name; b) line section location; c) control serial number; d) capacitor bank size; and e) pole or location number.

OPERATIONAL CRITERIA

Service Reliability:

1. System wide consumer outages are to be limited to less than 2.33 consumer outage hours (140 minutes) average per year.
2. Efforts, where practical, shall be made to provide alternative feeds to critical loads and substation feeders.
3. Outages will be evaluated and classified as to cause. The outages will then be evaluated for any reduction efforts that may be possible.
4. Every effort is encouraged to maintain a power supplier outage average per year of 1.0 hour per consumer. For averages above this level will be reviewed and evaluated with CHELCO's power supplier, PowerSouth EC.
6. Delivery points fed by radial taps that have a load-distance factor of more than 100 MW-miles will be evaluated for outages. If outages are in the supplier's top ten percent worse reliable sources, efforts will be reviewed for construction of a loop to that delivery point.

2011-2014 CONSTRUCTION WORK PLAN
System Design and Operational Criteria (continued)

OPERATIONAL CRITERIA (Continued)

Voltage Conditions:

1. Voltage levels will be maintained in accordance with the latest edition of the American National Standards Institute (ANSI) Standard C84.1. The ANSI Standard defines "Range A" and "Range B" voltage limits as follows:

Range A - Service Voltage

Electric supply systems shall be so designed and operated that most service voltages are within the limits specified for this range. The occurrence of service voltages outside these limits is to be infrequent.

Range A - Utilization Voltage

User systems shall be so designed and operated such that, with service voltages within Range A limits, most utilization voltages are within the limits specified for this range. Utilization equipment shall be so designed and rated to give fully satisfactory performance throughout this range.

Range B - Service and Utilization Voltages

This range includes voltages above and below Range A limits that necessarily result from practical design and operating conditions on supply and/or user systems. Although such conditions are a part of practical operations, they shall be limited in extent, frequency and duration. When they occur, corrective measures shall be undertaken within a reasonable time to improve voltages to meet Range A requirements.

Insofar as practicable, utilization equipment shall be designed to give acceptable performances in the extremes of this range of utilization voltage, although not necessarily as good performance as in Range A.

Table 1. **Voltage Ranges ANSI Standard C84.1 (120 volt base)**

Range	Minimum			Maximum
	Utilization Voltage*			
	Non-lighting loads	Loads including lighting	Service Voltage	Utilization & Service Voltage
A	108	110	114	126
B	104	106	110	127

*Note: Caution should be exercised in using minimum utilization voltage as in some cases they may not be satisfactory for the equipment served. For example, where existing 220-volt motors are used on 208-volt circuits, the minimum utilization voltage permitted would not be adequate for the operation or motors.

OPERATIONAL CRITERIA (continued)

Voltage Conditions: (Continued)

2. CHELCO's Recommended Design Criteria:

a. Rural electric distributions systems should be designed and operated to meet the voltage level requirements of "Range A" in ANSI C84.1-1970. Users' utilization electrical equipment of all types will generally be designed to give satisfactory performance in this range.
b. It is recognized that maintaining voltage levels within "Range A" on all parts of the system at all times cannot be assured. Due to the economics of operation, there may be some system voltages that fall in extremes of "Range B" and even beyond. This may occasionally occur as the feeder reaches its design loading limit at annual or semi-annual peak loads.
c. When voltages frequently extend into "Range B", they should be corrected to conform to "Range A" requirements within a reasonable time. If voltages on any part of the system fall outside the limits of "Range B", corrective actions should be taken immediately to bring these voltages within "Range B" requirements within a reasonable time.

Some types of utilization equipment will not perform satisfactorily or efficiently at the extremes of "Range B" voltages. Outside "Range B" voltage limits, many types of utilization equipment may fail to operate and may be seriously damaged or suffer shortened operating life. Voltages above these limits of Range B may be especially damaging to the users' equipment.

Table 2. Voltage Drops for Rural Electric Distribution System Design (120 volt base)

	Maximum Volts Drop	**Percent Volts Drop**
Substation regulated bus (output) to last distribution transformer (primary)	6	5 %
Distribution transformer (primary) to service delivery connection to consumers' wiring (meter or entrance switch)	4	3.33 %
Utility service delivery point (meter or entrance switch) to consumers' utilization terminal (outlet):		
Loads including Lights	4	3.33 %
Non-lighting Loads	6	5.00 %

3. CHELCO's recommended operating voltage level and limit values are based on the following:

a. The outgoing substation voltage is regulated by a suitable voltage regulator as defined in Section A, Substations, of this exhibit.
b. The regulator voltage band width setting does not exceed two volts on a 120-volt base.
c. Voltage values used are at the center of the voltage regulator band width.
d. All voltage regulators, whether at the substation or out on the line, have properly set and functioning line drop compensation (LDC).
e. Only sustained voltages apply to these levels and limits. The flicker and variations caused by motor starting, equipment switching, variation of voltage within the voltage regulator band width, and similar short duration variations are not considered.

OPERATIONAL CRITERIA (continued)

Voltage Conditions: (Continued)

4. Voltage input to Distribution Substations

The voltage input to distribution substations should be kept within limits as follows:

a. Substation voltages are kept within the design limits of the substation transformers and other equipment.

Annual System Losses:

1. Efforts will be made to limit the annual system losses to 5.0% or less.
2. When there is a more than 1.0% change in losses from one year to the next, efforts are to be made to evaluate the cause. Such efforts should include the following to assure that there is not a metering error with the power supplier or a large power consumer resulting in incorrect charges and/or revenue:

- Check all substations that have had a change in metering equipment over the last 12 - 24 months.
- Check all new substations that were constructed over the last 12 - 24 months and verify correctness of metering.
- Check all new or recently revised large power load metering over the last 12 - 24 months and verify correctness.

3. Line drop compensation will be utilized on all system regulators to reduce voltage levels and losses during off-peak conditions.

Annual Load Factor:

1. The annual load factor for the system will be monitored on a twelve month basis and efforts will be made to maintain a level of 45% or higher. Efforts to maintain such could be as follows:

- Develop retail rates to encourage consumers to use and rely on electric power for their needs.
- Regularly evaluate the use of load management switches for generators, air conditioning and hot water heater loads and implement such when the economics are present justifying such.
- Encourage low load factor large power load consumers towards interruptible service using another source of energy during peak loading conditions.

2. Purchase the following distribution equipment on an evaluated losses basis to reduce system losses and to contribute to a higher annual load factor:

- Capacitors
- Voltage regulators

CHOCTAWHATCHEE ELECTRIC COOPERATIVE, INC.
Florida 30
DeFuniak Springs, Florida

2011-2014 CONSTRUCTION WORK PLAN (CWP)

LARGE POWER LOADS
(Loads greater than 150 KW)
Summer 2009 & Winter 2008/09

Account #	Name	Substation	Circuit	Map Number	Large Power #	Large Power #	KW Summer	KWH Summer	KW Winter	KWH Winter
204060925	Okaloosa County BCC	Auburn	10014	08723009	145010	LP25	129	5,920	170	3,760

DOCKET NO. 100304-EU
EXHIBIT (JNS-2)
CONSTRUCTION WORK PLAN
PAGE 36 OF 44

EXHIBIT M

CHOCTAWHATCHEE ELECTRIC COOPERATIVE, INC.
Florida 30
DeFuniak Springs, Florida

2011-2014 CONSTRUCTION WORK PLAN (CWP)

SUBSTATION LOAD DATA
Probable Summer Loading Conditions (2009 Base)

				2009 - Base Summer System Peak				Projected Summer 2014 System Peak W/O Improvements *2				Projected Summer 2014 System Peak After Improvements			
Sub No.	Substation Name	Existing Capacity kVA *1	Proposed Capacity kVA *1	Power Factor	Actual kW	Actual kVA	Percent Loaded	Power Factor	Projected kW	Projected kVA	Percent Loaded	Power Factor	Projected kW	Projected kVA	Percent Loaded
1	Laurel Hill	7,500		100.0%	4,550	4,550	60.7%	100.0%	4,912	4,912	65.5%	100.0%	4,919	4,919	65.6%
2															
3															
4															
5															
6															
7															
8															
9															
10	Auburn	20,000		100.0%	14,570	14,570	72.9%	100.0%	16,593	16,593	83.0%	100.0%	16,717	16,717	83.6%
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
	Totals				191,200	191,200			211,106	211,644			211,645	211,645	

*1 Maximum continuous loading 55° raing as provided by PowerSouth Energy Cooperative (PowerSouth EC).
*2 Includes 2010 system improvements and Large Power loads not included in 2009 LF (Emerald Coast Middle School & Mossyhead Industrial Park)

DOCKET NO. 100304-EU
EXHIBIT (JNS-2)
CONSTRUCTION WORK PLAN
PAGE 37 OF 44

CHOCTAWHATCHEE ELECTRIC COOPERATIVE, INC.
Florida 30
DeFuniak Springs, Florida

2011-2014 CONSTRUCTION WORK PLAN (CWP)

SUBSTATION LOAD DATA
Probable Winter Loading Conditions (2008/09 Base)

Sub No.	Substation Name	Existing Capacity kVA *1	Proposed Capacity kVA *1	2008/09 - Base Winter System Peak				2009/10 Winter System Peak				Projected Winter 2013/14 System Peak W/O Improvements *2				Projected Winter 2013/14 System Peak After Improvements			
				Power Factor	Actual kW	Actual kVA	Percent Loaded	Power Factor	Actual kW	Actual kVA	Percent Loaded	Power Factor	Projected kW	Projected kVA	Percent Loaded	Power Factor	Projected kW	Projected kVA	Percent Loaded
1	Laurel Hill	7,500		100.0%	5,800	5,800	77.3%	100.0%	6,463	6,463	86.2%	99.0%	6,206	6,268	83.6%	99.0%	6,223	6,286	83.8%
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10	Auburn	20,000		100.0%	18,240	18,240	91.2%	100.0%	20,495	20,495	102.5%	99.0%	20,589	20,797	104.0%	98.0%	20,641	21,062	105.3%
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			
21																			
22																			
	Totals				201,030	201,030			229,263	229,263			218,910	220,025			218,501	222,533	

*1 Maximum continuous loading 55° raing as provided by PowerSouth Energy Cooperative (PowerSouth EC).
*2 Includes 2010 system improvements and Large Power loads not included in 2009 LF (Emerald Coast Middle School & Mossyhead Industrial Park)

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EXHIBIT (JNS-2)
CONSTRUCTION WORK PLAN
PAGE 38 OF 44

CHOCTAWHATCHEE ELECTRIC COOPERATIVE, INC.
Florida 30
DeFuniak Springs, Florida

2011-2014 CONSTRUCTION WORK PLAN (CWP)
Distribution Line Open Changes

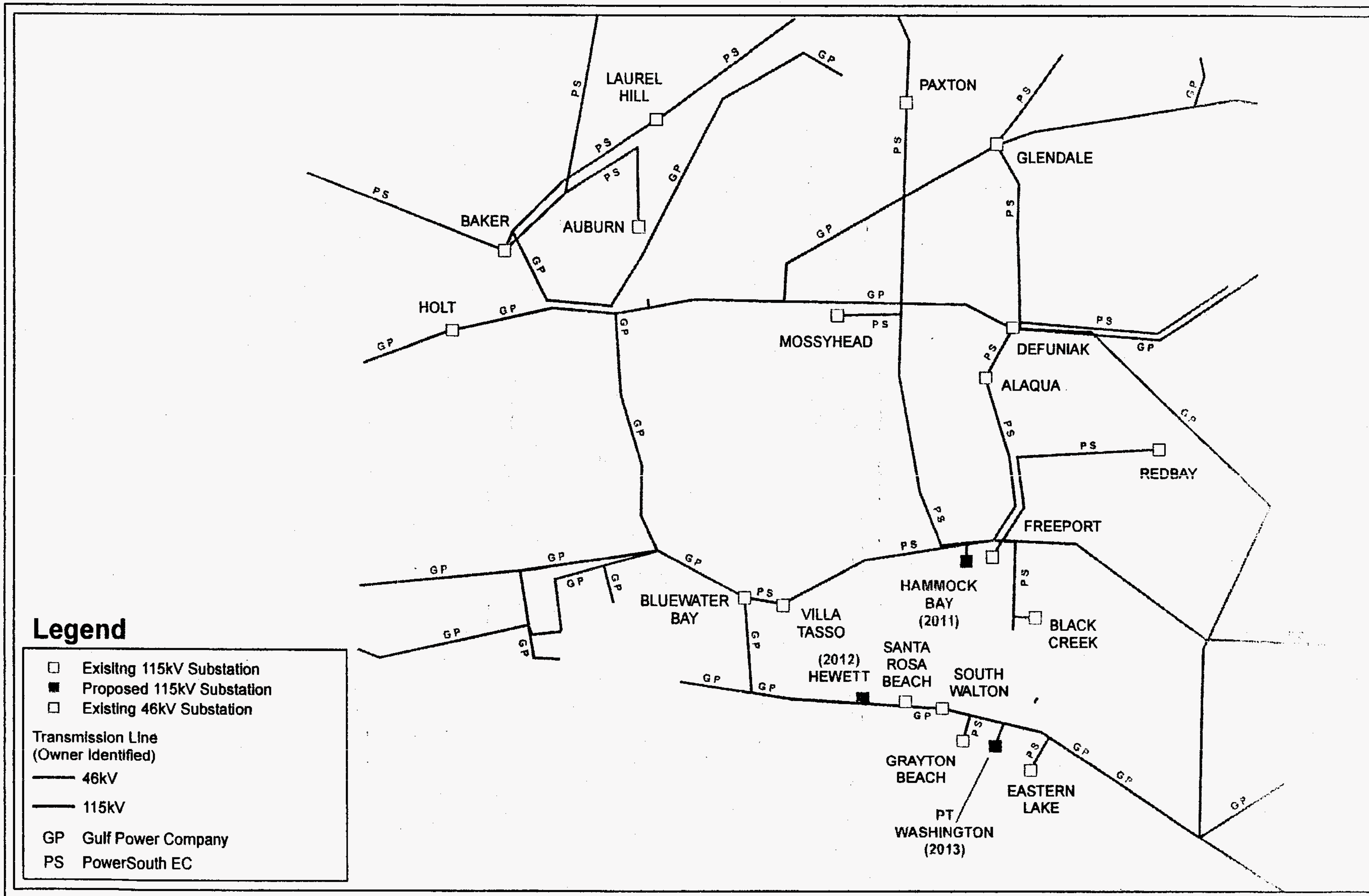
ASAP - Change open as soon as possible
ASI - Change open after indicated system improvement
+ See CWP Map for general locations

Substation	Circuit	Nearest Switch or Device Close Location +	Substation	Circuit	Nearest Switch or Device Open Location +	Priority
Auburn	1002	new tie point	Auburn	1002	10906S01	ASI - 200-10-01

DOCKET NO. 100304-EU
EXHIBIT (JNS-2)
CONSTRUCTION WORK PLAN
PAGE 39 OF 44

EXHIBIT O

DOCKET NO. 100304-EU
EXHIBIT (JNS-2)
CONSTRUCTION WORK PLAN
PAGE 40 OF 44



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5 2.5 0 5 10 15 Miles

N S W E

TRANSMISSION LINE DIAGRAM

DATE	REVISIONS	CHOCTAWHATCHEE ELECTRIC COOPERATIVE, INC. *DEFUNIAK SPRINGS, FLORIDA* FLORIDA 30	TRANSMISSION EXHIBIT P

PATTERSON & DEWAR ENGINEERS, INC. NORCROSS, GA
DWN BY: BJR | CKD BY: | APPD BY: | ENGRS FILE: FL30.01.10 | DATE: APRIL 2010

2011-2014 CONSTRUCTION WORK PLAN

DISTRIBUTION LINE CONSTRUCTION PROJECT REVIEW (Continued)

Reference Number: 200-10-01 | Estimated Cost: $12,663

Proposed Year: 2014

Description of Proposed Construction

Build 0.2 miles of 1ø 2 AAAC conductor along John Nix Road.

Substation	Circuit	Nearest Device	Miles	Existing Phase-Wire	Proposed Phase-Wire
Auburn	1002	10906S01	0.2	N/A	1ø 2 AAAC

Reason for Proposed Construction

The above work is required to improve system reliability and relieve loading on the single phase conductor which will be loaded to 87 Amps in the winter. The design criteria used recommends single phase lines to not be loaded with more than 60 Amps under normal operating conditions.

Results of Proposed Construction

Winter Future System W/O Improvements			Winter Future System After Improvements		
Load Amps	Voltage Drop	Losses ($/year)	Load Amps	Voltage Drop	Losses ($/year)
87	9.8	$77,658	50	9.6	$74,794

After this project is complete, the load will be swapped to another single phase tap. The losses will be reduced by $2,864 per year. The load on the single phase tap will be reduced to 50 Amps after the switching is complete.

Alternate Corrective Plans Investigated

Multiphase the single phase line. This is not preferred because the right-of-way is heavily wooded and along a narrow dirt road.

2011-2014 CONSTRUCTION WORK PLAN

DISTRIBUTION LINE CONSTRUCTION PROJECT REVIEW (Continued)

Reference Number: 300-RU10-01

Estimated Cost: $227,404

Proposed Year: 2014

Description of Proposed Construction

Replace 1.3 miles of 3ø 394 AAAC conductor with 3ø 740.8 AAAC conductor along Highway 85. Replace poles and equipment as required.

Substation	Circuit	Nearest Device	Miles	Existing Phase-Wire	Proposed Phase-Wire
Auburn	1003	10614S18	1.3	3ø 394 AAAC	3ø 740.8 AAAC

Reason for Proposed Construction

The above work is required to improve system reliability and relieve overloading of the conductor which will be loaded to 61% of operating capacity in the summer. The design criteria used recommends conductor loading not to exceed 60% of its operating capacity for summer loads.

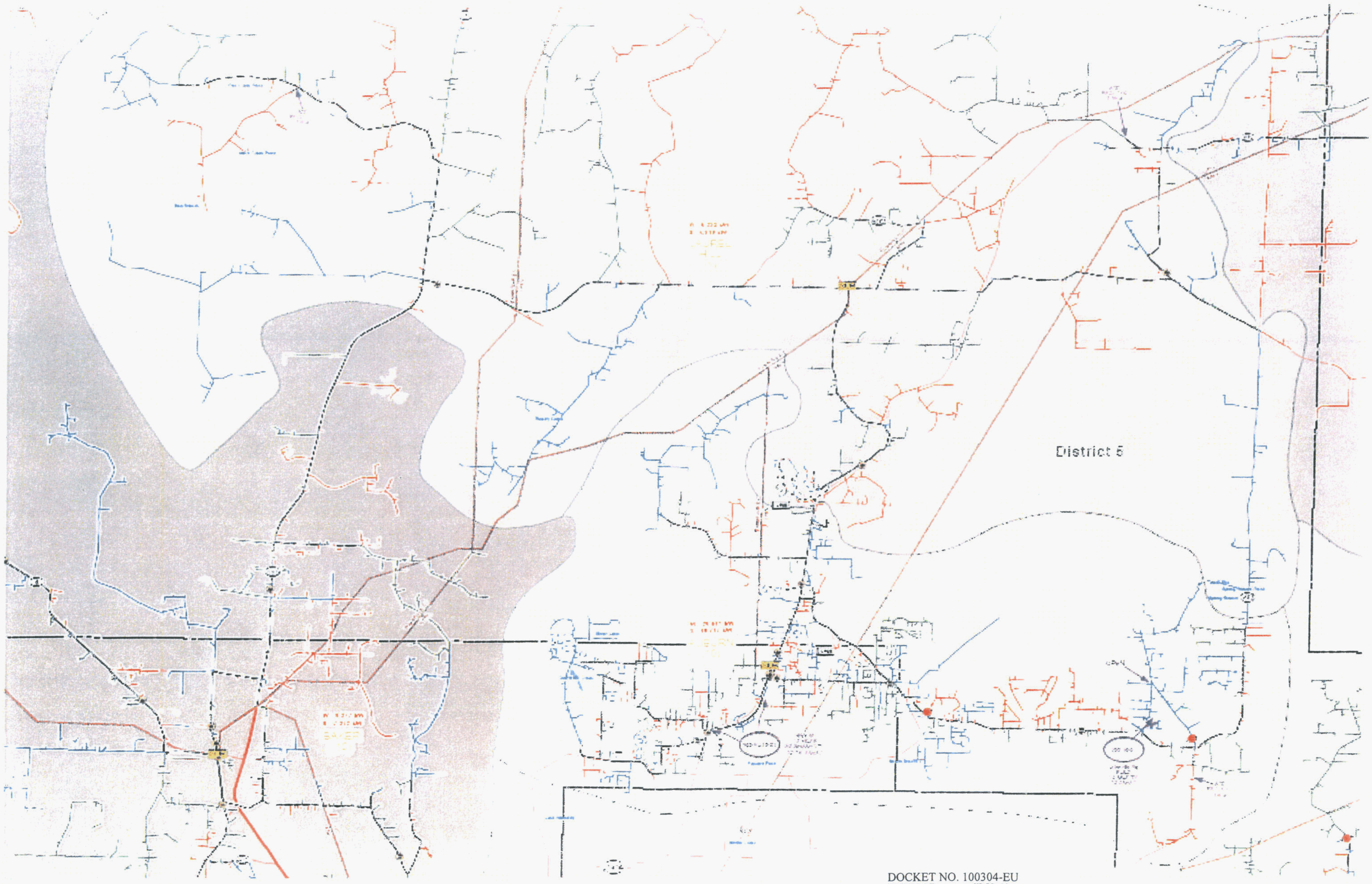
Results of Proposed Construction

Summer Future System W/O Improvements			Summer Future System After Improvements		
Load Amps	Voltage Drop	Losses ($/year)	Load Amps	Voltage Drop	Losses ($/year)
325	6.6	$31,838	325	5.7	$23,921

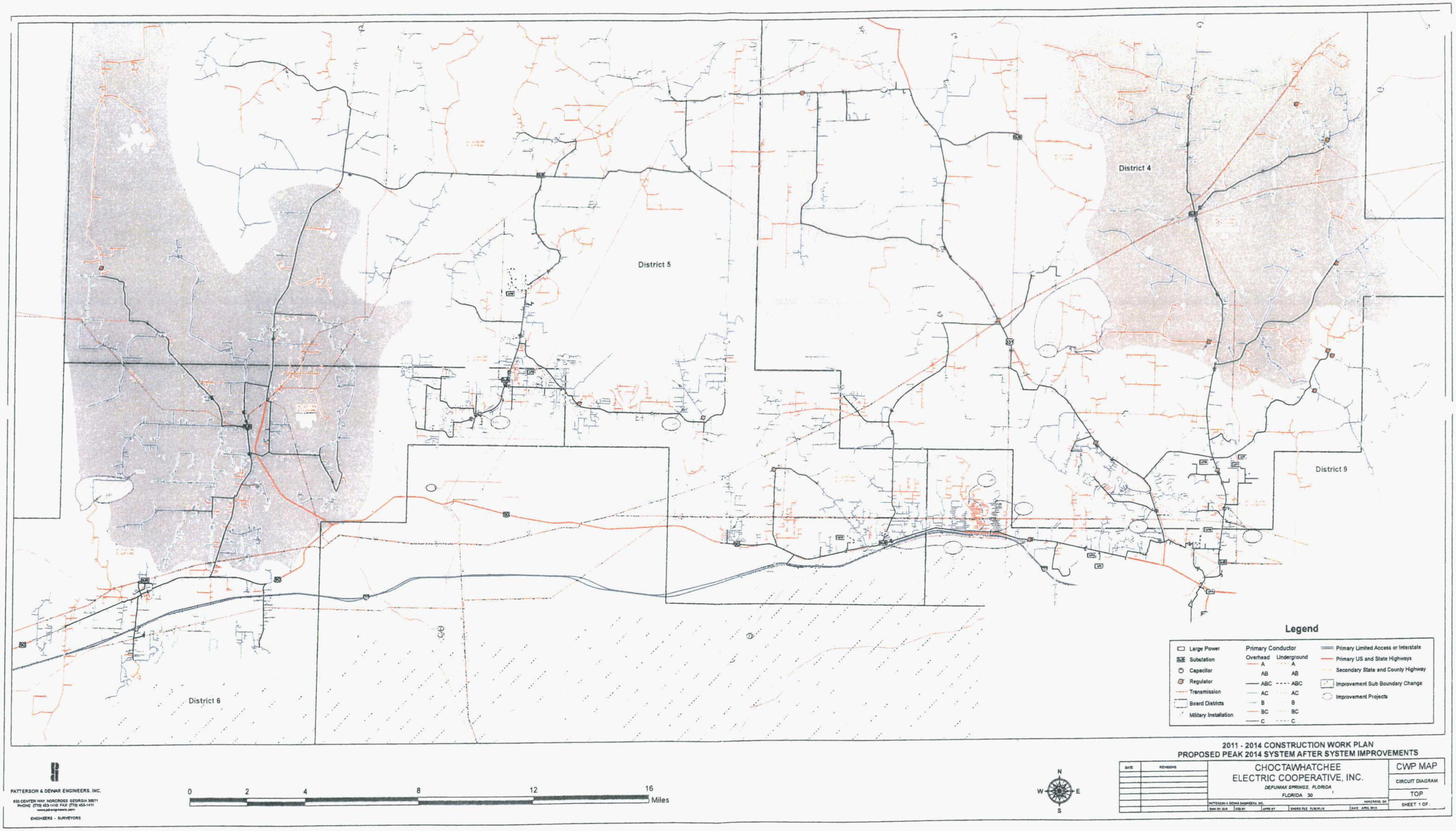
The losses will be reduced by $7,917 per year. Loading on the circuit will be reduced to 41% in the summer.

Alternate Corrective Plans Investigated

Possible alternative corrective plans were reviewed, and no suitable alternatives were found.



DOCKET NO. 100304-EU
EXHIBIT _____ (JNS-2)
CONSTRUCTION WORK PLAN
PAGE 43 OF 44


District 4
District 5
District 6
District 9
Legend
Large Power
Substation
Capacitor
Regulator
Transmission
Board Districts
Military Installation
Primary Conductor
Overhead
Underground
A
AB
ABC
AC
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BC
C
Primary Limited Access or Interstate
Primary US and State Highways
Secondary State and County Highway
Improvement Sub Boundary Change
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2011 - 2014 CONSTRUCTION WORK PLAN
PROPOSED PEAK 2014 SYSTEM AFTER SYSTEM IMPROVEMENTS
REVISIONS
CHOCTAWHATCHEE
ELECTRIC COOPERATIVE, INC.
DEFUNIAK SPRINGS, FLORIDA
FLORIDA 30
CWP MAP
CIRCUIT DIAGRAM
TOP
SHEET 1 OF

Choctawhatchee Electric Cooperative, Inc.
DeFuniak Springs, Florida

Engineering Study for New Subdivision Substation Recommendations

July 7, 2010

Results of Analysis: The analysis shows that CHELCO's existing electric system is capable of handling the additional 3,700 kW of load if it were added today. Should this additional load be added to CHELCO's system, it is recommended that CHELCO complete all Auburn Substation 2011-2014 Construction Work Plans in 2011 instead of 2014 to prepare for further growth in the area.

Data Used:

- The 2014 peak summer and 2014 peak winter Milsoft Windmil software models from CHELCO's 2011-2014 Construction Work Plan (CWP)
- The 2009 peak summer and 2009 peak winter Milsoft Windmil software base system models
- CHELCO's System Design & Operating Criteria

Details of Analysis:

A new subdivision with an anticipated load of 3,700 kW is to be located at the intersection of Roberts Avenue and Old Bethel Road. Should CHELCO serve this new load, Auburn Substation, circuit #3 would be the substation and circuit the new load would be served from.

Is CHELCO's system capable of serving this load today and into the future?

If so, what, if any, improvements would be necessary to serve this new load?

Patterson & Dewar (P&D) worked with CHELCO on their 2011-2014 Construction Work Plan, completed in May 2010. The 2014 peak summer and winter Milsoft Windmil models were used in this analysis along with CHELCO's existing base 2009 peak summer and winter models. CHELCO's System Design and Operating Criteria (SDOC) was also used. The portion of the SDOC that applies to this study is included below.

Substations:
The following maximum loading conditions as a percent of the **full** equipment nameplate ratings based on CHELCO's extreme load forecasts, are recommended. When these levels are projected to be exceeded, plans for uprating are to be scheduled:

Power Transformers - Summer loading – 100% continuous loading at 55° rating
Winter loading – 124% continuous loading at 55° rating

Conductor:
Primary conductors are not to be loaded for long periods of time, over 60% of operating capacity for summer loading conditions and 75% for winter.

Voltage Drop:

Voltage Ranges ANSI Standard C84.1 (120 volt base)

Range	Minimum			Maximum
	Utilization Voltage*			
	Non-lighting loads	Loads including lighting	Service Voltage	Utilization & Service Voltage
A	108	110	114	126
B	104	106	110	127

Where this new subdivision will be located, CHELCO already has a main 3-phase line that is presently serving customers on Roberts Avenue and Old Bethel Road. Adding this new 3,700 kW load would not require any additional 3-phase overhead construction to reach the new load. The only construction necessary would be for the new development itself.

Referring to the Excel document "new load analysis.xlsx", the 2009 peak summer and winter Windmil models:

Voltage Drop:
With the new load, there will be more voltage drop than without the new load (which is to be expected) but the additional drop in voltage is still within CHELCO's SDOC[1].

Conductor:
Some of the conductor, mainly the 394 AAAC will be loaded more than the SDOC recommends. In CHELCO's CWP that was completed in May 2010, it was already recommended (project 300-RU10-01) to upgrade this 394 AAAC to 741 AAAC; however, this recommendation was for 2014. Should CHELCO serve this new load, it is recommended that the CWP project 300-RU10-01 be completed in 2011 instead of 2014.

Substations:
Auburn substation will not exceed the SDOC for subs.

Referring to the Excel document "new load analysis.xlsx", the 2014[2] peak summer and winter Windmil models:

Voltage Drop:
With the new load, there will be more voltage drop than without the new load (which is to be expected) but the additional drop in voltage is still within CHELCO's SDOC. The voltage drop is not as low as with the 2009 models because the 2014 model includes capacitor recommendations and reconductoring recommendations from the CWP.

[1] The 2009 winter model shows one section of single phase conductor downline from the new load at 114 V. This is not unusual for winter peak conditions and typically only occurs for a short duration. Voltage drops that do not meet the SDOC, especially during winter peaks could happen anywhere on the system. Voltage drops that last for extended periods of time are easily addressed by adding voltage regulators.

[2] The 2014 peak summer and winter models include projected system growth for 2014 along with all recommended projects in the 2011-2014 CWP as if they were completed.

Conductor:

Some of the three phase 741 AAAC and 750 MCM UG conductor will be loaded more than the SDOC recommends but only by a small percentage (4%-8% more than the SDOC recommends). It should be noted that the SDOC is a guideline and is used as such. So, though the loading on the conductor is greater than the guideline, because it's only a small percentage greater, it is recommended that CHELCO not upgrade the conductor. Similar recommendations by P&D were made for other parts of CHELCO's system during the completion of their 2011-2014 CWP.

Substations:

Using 2014 grown loads, Auburn substation exceeds the SDOC for both the winter and summer models. While exceeding the SDOC guidelines for conductor is acceptable (within reason), doing so for substations is not recommended because substations can take up to a year or two before they are energized from the time the decision is made to add a new delivery point. Some things that a cooperative can do to relieve a heavily loaded substation; however, is switch load to nearby substations, uprate the existing power transformer or add a second power transformer.

In the case here, it is recommended to switch load to Laurel Hill substation to relieve Auburn sub and bring it back to within the SDOC guidelines. This is not an uncommon recommendation or approach for CHELCO as they used this very same approach with Santa Rosa Beach substation in an effort to delay the new substation, Hewett, for a few years.

Looking beyond 2014 and thus beyond the period of the 2011-2014 CWP, there may one day be a need to uprate the existing transformer in Auburn Substation or add a new delivery point, but with a projected load of 84% in the summer of 2014 and 105% in the winter of 2014 (not including the new 3,700 kW load), the possibility of adding a new delivery point nearby Auburn sub would have been evaluated regardless of this new load.

Flor' 0
DeFuniak Sp...gs, Florida

Engineering Study for New Subdivision
July 7, 2010

General Information

Description: New subdivision with an estimated load of 3,700 kW to be served in 2010
Location: Near the intersection of Roberts Ave., & Old Bethel Road
Substation/circuit: Auburn substation, circuit 03

Analysis Results[1]

	2009 Peak Summer Model	2014 Peak Summer Model	2009 Peak Winter Model	2014 Peak Winter Model
Base System	Auburn Sub: 14,570 kW or 73% loaded Laurel Hill Sub: 4,550 kW or 61% loaded Conductor: 741 AAAC loaded to 291 A or 37% and 394 AAAC loaded to 55% and small section of 750 MCM UG (along Phil Tyner Road) loaded to 122 A or 27%. Voltage drop: Auburn sub ckt 03 meets CHELCO's SDOC[2].	Auburn Sub: 16,717 kW or 84% loaded Laurel Hill Sub: 4,919 kW or 66% loaded Conductor: 741 AAAC loaded to 335 A or 42%, and small section of 750 MCM UG (along Phil Tyner Road) loaded to 137 A or 30% Voltage drop on Auburn sub ckt 03 meets CHELCO's SDOC[2]	Auburn Sub: 18,240 kW or 91% loaded Laurel Hill Sub: 5,800 kW or 77% loaded Conductor: 741 AAAC loaded to 327 A or 41% and 394 AAAC loaded to 61% and small section of 750 MCM UG (along Phil Tyner Road) loaded to 314 A or 69% Voltage drop on Auburn sub ckt 03 meets CHELCO's SDOC[2]	Auburn Sub: 20,641 kW or 105% loaded Laurel Hill Sub: 6,223 kW or 84% loaded Conductor: 741 AAAC loaded to 377 A or 48%, and small section of 750 MCM UG (along Phil Tyner Road) loaded to 155 A or 34% Voltage drop on Auburn sub ckt. 03 meets CHELCO's SDOC[2]
Base System w/ New Load	Auburn Sub: 18,066 kW or 90% loaded Laurel Hill Sub: 4,550 kW or 61% loaded Conductor: 741 AAAC loaded to 463 A or 59% and 394 AAAC loaded to 87% and 750 MCM UG loaded to 300 A or 66% Voltage drop: Though still within SDOC, there is 115 V at the end of Auburn ckt 3, beyond new load on single phase line.	Auburn Sub: 20,225 kW or 101% loaded Laurel Hill Sub: 4,919 kW or 66% loaded Conductor: 741 AAAC loaded to 508 A or 64% and 750 MCM UG loaded to 313 A or 68% Voltage drop: Meets CHELCO's system design and operating criteria.	Auburn Sub: 21,736 kW or 109% loaded Laurel Hill Sub: 5,800 kW or 77% loaded Conductor: 741 AAAC loaded to 500 A or 63% and 394 AAAC loaded to 94% and 750 MCM UG loaded to 316 A or 69% Voltage drop: On one single phase tap on Auburn ckt 03 is 114 V, beyond new load. Everything else meets SDOC	Auburn Sub: 24,124 kW or 121% loaded Laurel Hill Sub: 6,223 kW or 84% loaded Conductor: 741 AAAC loaded to 554 A or 70% and 750 MCM UG loaded to 335 A or 73% Voltage drop: On one single phase tap on Auburn ckt 03 is 114 V, beyond new load. Everything else meets SDOC.
Recommendations	Follow the capacitor placement recommendations in the 2011-2014 CWP, but do the recommendations in 2011 and complete project 300-RU10-01 from the 2011 2014 CWP in 2011 instead of 2014.	Switch 1,050 kW from Auburn ckt. 01 to Laurel Hill ckt. 03 (making new open point near the intersection of Hwy 85 and Georgia Road). After load swap, on Laurel Hill ckt. 3, add 100 A voltage regulators on main 3 phase line near the intersection of Hwy 85 & Campton Street. In addition, on Auburn ckt. 3, it may be necessary to add capacitor banks upstream from the new load and/or voltage regulators downstream from the load; however, it's recommended that CHELCO monitor the circuit before doing this.	Follow recommendations for Summer 2009. In addition, on Auburn ckt. 3, it may be necessary to add capacitor banks upstream from the new load and/or voltage regulators downstream from the load; however, it's recommended that CHELCO monitor the circuit before doing this.	Follow recommendations for Summer 2014 model.
Results of Recommendations	Auburn Sub: 18,261 kW or 91% loaded Laurel Hill Sub: 4,550 kW or 61% loaded Conductor: 741 AAAC loaded to 465 A or 59% and 750 MCM UG loaded to 300 A or 66%. Voltage drop: Meets CHELCO's SDOC	Auburn Sub: 19,263 kW or 96% loaded Laurel Hill Sub: 5,595 kW or 75% loaded Conductor: No changes from 'Base System w/ New Load'. Voltage drop: Meets CHELCO's SDOC	Auburn Sub: 21,736 kW or 109% loaded Laurel Hill Sub: 5,800 kW or 77% loaded Conductor: 741 AAAC loaded to 500 A or 63% and 750 MCM UG loaded to 316 A or 69%. Voltage drop: Meets CHELCO's SDOC	Auburn Sub: 22,732 kW or 114% loaded Laurel Hill Sub: 7,525kW or 100% loaded Conductor: No changes from 'Base System w/ New Load'. Voltage drop: Meets CHELCO's SDOC

[1] 2009 base and 2014 grown models from CHELCO's 2011-2014 Construction Work Plan (CWP) completed in May 2010
[2] System Design and Operating Criteria

From: Nicole Mabe [mailto:NMabe@pdengineers.com]
Sent: Friday, July 02, 2010 2:22 PM
To: Matthew Avery
Subject: new 3,700 kW load

Matthew,

Attached are the results of my analysis of Auburn Substation with the additional 3,700 kW of residential load. I modeled the new load on 4 Milsoft models; summer 2009 base, summer 2014 after CWP system improvements, winter 2009 base and winter 2014 after system improvements.

One question, Matthew...what are the breakers rated for on ckt. 3, Auburn Sub?

Have a good holiday weekend!

J. Nicole Mabe, PE
Patterson & Dewar Engineers, Inc.
850 Center Way
Norcross, GA 30071
Phone: (770) 453-1410 Fax: (770) 453-1411
email: nmabe@pdengineers.com

General Information

New residential subdivision with estimated load of 3,700 kW

Substation: Auburn

Circuit: 03

Location: near the intersection of Roberts Ave. and Old Bethel Road

2009 Summer Model

Base System

Auburn Sub: 14,570 kW or 73%

Laurel Hill Sub: 4,550 kW or 61%

Conductor Loading: 741 AAAC loaded to 291 A or 37% and 394 AAAC loaded to 55% and small section of 750 MCM UG (along Phil Tyner Road) loaded to 122 A or 27%

Voltage drop on Auburn sub ckt 03 meets CHELCO's system design and operating criteria

Base System w/ New Load

Auburn Sub: 18,066 kW or 90%

Conductor loading: 741 AAAC loaded to 463 A or 59% and 394 AAAC loaded to 87% and 750 MCM UG loaded to 300 A or 66%

Voltage drop at extremes as low as 115 V at the end of ckt 3

Recommendations:

Follow the CWP for the capacitor placements (do this in 2011 to help voltage) and do project 300-RU10-01 in 2011 instead of 2014.

Results of Recommendations:

Auburn Sub: 18,261 kW or 91%

Laurel Hill Sub: 4,550 kW or 61%

Conductor Loading: 741 AAAC will be loaded to 465 A or 59% and 750 MCM UG loaded to 300 A or 66%.

Voltage meets CHELCO's system design and operating criteria.

2014 Summer Model after CWP projects have been completed

Base Model
Auburn Substation: 16,717 kW or 84%
Laurel Hill Substation: 4,919 kW or 66%
Conductor Loading: 741 AAAC loaded to 335 A or 42%, and small section of 750 MCM UG (along Phil Tyner Road) loaded to 137 A or 30%
Voltage drop on Auburn sub ckt 03 meets CHELCO's system design and operating criteria

Base Model w/ New Load
Auburn Substation: 20,225 kW or 101%
Laurel Hill Substation: 4,919 kW or 66%
Conductor Loading: 741 AAAC loaded to 508 A or 64% and 750 MCM UG loaded to 313 A or 68%
Voltage drop meets CHELCO's system design and operating criteria.

Recommendations:
Switch 1,050 kW from Auburn ckt. 01 to Laurel Hill ckt. 03 (making new open point near the intersection of Hwy 85 and Georgia Road?). After load swap, on Laurel Hill ckt. 3, add 100 A voltage regulators on main 3 phase line near the intersection of Hwy 85 & Campton Street. In addition, on Auburn ckt. 3, it may be necessary to add capacitor banks upstream from the new load and/or voltage regulators downstream from the load; however, it's recommended that CHELCO monitor the circuit before doing this.

Results of Recommendations:
Auburn Sub: 19,263 kW or 96%
Laurel Hill Sub: 5,595 kW or 75%
Conductor Loading: no changes. 741 AAAC will be loaded to 64% and 750 MCM UG loaded to 68%.
Voltage meets CHELCO's system design and operating criteria.

2009 Winter Model

Base System
Auburn Sub: 18,240 kW or 91%
Laurel Hill Sub: 5,800 kW or 77%
Conductor Loading: 741 AAAC loaded to 327 A or 41% and 394 AAAC loaded to 61% and small section of 750 MCM UG (along Phil Tyner Road) loaded to 314 A or 69%
Voltage drop on Auburn sub ckt 03 meets CHELCO's system design and operating criteria

Base System w/ New Load
Auburn Sub: 21,736 kW or 109%
Conductor loading: 741 AAAC loaded to 500 A or 63% and 394 AAAC loaded to 94% and 750 MCM UG loaded to 316 A or 69%
Voltage drop on one single phase tap on Auburn ckt 03 is 114 V. Everything else looks good.

Recommendations:
Follow recommendations for Summer 2009. In addition, on Auburn ckt. 3, it may be necessary to add capacitor banks upstream from the new load and/or voltage regulators downstream from the load; however, it's recommended that CHELCO monitor the circuit before doing this.

Results of Recommendations:
Auburn Sub: 21,736 kW or 109%
Laurel Hill Sub: 5,800 kW or 77%
Conductor Loading: 741 AAAC will be loaded to 500 A or 63% and 750 MCM UG loaded to 316 A or 69%.
Voltage on Auburn ckt. 3 meets CHELCO's system design and operating criteria.

2014 Winter Model after CWP projects have been completed

Base Model
Auburn Substation: 20,641 kW or 105%
Laurel Hill Substation: 6,223 kW or 84%
Conductor Loading: 741 AAAC loaded to 377 A or 48%, and small section of 750 MCM UG (along Phil Tyner Road) loaded to 155 A or 34%
Voltage drop on Auburn sub ckt. 03 meets CHELCO's system design and operating criteria

Base Model w/ New Load
Auburn Substation: 24,124 kW or 121%
Conductor Loading: 741 AAAC loaded to 554 A or 70% and 750 MCM UG loaded to 335 A or 73%
Voltage drop on one single phase tap on Auburn ckt 03 is 114 V. Everything else looks good.

Recommendations:
Follow recommendations for Summer 2014 model.

Results of Recommendations:
Auburn Sub: 22,732 kW or 114%
Laurel Hill Sub: 7,525kW or 100%
Conductor Loading: no changes. 741 AAAC will be loaded to 70% and 750 MCM UG loaded to 73%.
Voltage on Auburn ckt. 3 meets CHELCO's design criteria.

CHOCTAWHATCHEE ELECTRIC COOPERATIVE, INC.
Florida 30
DeFuniak Springs, Florida

Engineering Study for Freedom Walk Development
Modeled Using 4,700 kW
February 1, 2011

General Information

Description: New subdivision with an estimated load of 4,700 kW to be served in 2011
Location: Near the intersection of Roberts Ave., & Old Bethel Road
Substation/circuit: Auburn substation, circuit 03

Analysis Results[1]

	2009 Peak Summer Model BSI[3]	2014 Peak Summer Model BSI[3]	2014 Peak Summer Model ASI[3]	2009 Peak Winter Model BSI[3]	2014 Peak Winter Model BSI[3]	2014 Peak Winter Model ASI[3]
Base System	Auburn Sub: 14,570 kW or 73% loaded Laurel Hill Sub: 4,550 kW or 61% loaded Conductor: 741 AAAC loaded to 291 A or 37% and 394 AAAC loaded to 55% and small section of 750 MCM UG (along Phil Tyner Road) loaded to 122 A or 27%. Voltage drop: Auburn sub ckt 03 meets CHELCO's SDOC[2].	Auburn Sub: 16,717 kW or 84% loaded Laurel Hill Sub: 4,919 kW or 66% loaded Conductor: 741 AAAC loaded to 335 A or 42%, 394 AAAC loaded to 63% and small section of 750 MCM UG (along Phil Tyner Road) loaded to 137 A or 30% Voltage drop on Auburn sub ckt 03 meets CHELCO's SDOC[2]	Auburn Sub: 16,717 kW or 84% loaded Laurel Hill Sub: 4,919 kW or 66% loaded Conductor: 741 AAAC loaded to 335 A or 42%, and small section of 750 MCM UG (along Phil Tyner Road) loaded to 137 A or 30% Voltage drop on Auburn sub ckt 03 meets CHELCO's SDOC[2]	Auburn Sub: 18,240 kW or 91% loaded Laurel Hill Sub: 5,800 kW or 77% loaded Conductor: 741 AAAC loaded to 327 A or 41% and 394 AAAC loaded to 61% and small section of 750 MCM UG (along Phil Tyner Road) loaded to 314 A or 69% Voltage drop on Auburn sub ckt 03 meets CHELCO's SDOC[2]	Auburn Sub: 20,641 kW or 105% loaded Laurel Hill Sub: 6,223 kW or 84% loaded Conductor: 741 AAAC loaded to 377 A or 48%, 394 AAAC loaded to 71% and small section of 750 MCM UG (along Phil Tyner Road) loaded to 155 A or 34% Voltage drop on Auburn sub ckt. 03 meets CHELCO's SDOC[2]	Auburn Sub: 20,641 kW or 105% loaded Laurel Hill Sub: 6,223 kW or 84% loaded Conductor: 741 AAAC loaded to 377 A or 48%, and small section of 750 MCM UG (along Phil Tyner Road) loaded to 155 A or 34% Voltage drop on Auburn sub ckt. 03 meets CHELCO's SDOC[2]
2011-2014 CWP Recommendations	This is referred to as the Base model for the CWP. The base model is grown to a future 2014 load (per the 2009 Load Forecast) and CWP projects are recommended based on the grown loads. See next column for summer 2014 recommendations.	Follow the capacitor placement recommendations in the 2011-2014 CWP and complete project 300-RU10-01 from the 2011-2014 CWP in 2014. Project 300-RU10-01 was recommended because the load on the 394 AAAC exceeds the SDOC and because it makes engineering sense to carry the 741 AAAC down to where the load splits almost 50/50.	No additional recommendations. The purpose of this column is to show how the system looks as a result of completing the recommended projects in the previous column, 2014 Peak Summer Model BSI.	This is referred to as the Base model for the CWP. The base model is grown to a future 2014 load (per the 2009 Load Forecast) and CWP projects are recommended based on the grown loads. See next column for winter 2014 recommendations.	No additional recommendations due to 2014 winter peak loads. Only recommendation is to follow the recommendations for 2014 Peak Summer Model BSI.	No additional recommendations. The purpose of this column is to show how the system looks as a result of completing the recommended projects in the previous column, 2014 Peak Winter Model BSI.
Base System w/ New Load	Auburn Sub: 19,226 kW or 96% loaded Laurel Hill Sub: 4,550 kW or 61% loaded Conductor: 741 AAAC loaded to 507 A or 64% and 394 AAAC loaded to 95% and 750 MCM UG loaded to 344 A or 75% Voltage drop: 114 V at the end of Auburn ckt 3, beyond new load. CWP project 300-RU10-01 will improve the voltage or add voltage regulators.	Auburn Sub: 21,225 kW or 106% loaded Laurel Hill Sub: 4,919 kW or 66% loaded Conductor: 741 AAAC loaded to 549 A or 69%, 394 AAAC loaded to 103% and 750 MCM UG loaded to 361 A or 79% Voltage drop: 113 V at the end of Auburn ckt 3, beyond new load. CWP project 300-RU10-01 will improve the voltage.	Auburn Sub: 21,399 kW or 107% loaded Laurel Hill Sub: 4,919 kW or 66% loaded Conductor: 741 AAAC loaded to 553 A or 70% and 750 MCM UG loaded to 358 A or 78% Voltage drop: Meets CHELCO's system design and operating criteria.	Auburn Sub: 22,926 kW or 115% loaded Laurel Hill Sub: 5,800 kW or 77% loaded Conductor: 741 AAAC loaded to 545 A or 69% and 394 AAAC loaded to 102% and 750 MCM UG loaded to 359 A or 79% Voltage drop: 113 V at the new load and downstream from it. CWP project 300-RU10-01 will improve most of the low voltage, with voltage regulators needed downline from the new load. Also, the project is needed b/c the 394 will be overloaded with the development at full capacity.	Auburn Sub: 25,270 kW or 126% loaded Laurel Hill Sub: 6,223 kW or 84% loaded Conductor: 741 AAAC loaded to 589 A or 75%, 394 AAAC loaded to 111% and 750 MCM UG loaded to 377 A or 82% Voltage drop: 113 V at the end of Auburn ckt 3, beyond new load. CWP project 300-RU10-01 will improve the voltage and also the capacitor placement recommendations in the CWP. May need to add additional capacitors.	Auburn Sub: 25,322 kW or 127% loaded Laurel Hill Sub: 6,223 kW or 84% loaded Conductor: 741 AAAC loaded to 598 A or 76% and 750 MCM UG loaded to 378 A or 83% Voltage drop: On some single phase taps on Auburn ckt 03 is 114 V, beyond new load. Everything else meets SDOC.
Results of All Recommendations (CWP and recommendations as a result of new load)	Auburn Sub: 19,228 kW or 96% loaded Laurel Hill Sub: 4,550 kW or 61% loaded Conductor: 741 AAAC loaded to 507 A or 64% and 750 MCM UG loaded to 344 A or 75% Voltage drop: Meets CHELCO's SDOC once voltage regulators are added downline from new load or project 300-RU10-01 is	Auburn Sub: 19,970 kW or 100% loaded Laurel Hill Sub: 6,332 kW or 84% loaded Conductor: Auburn ckt. 03: 741 AAAC loaded to 542 A or 69% and 750 MCM UG loaded to 358 A or 78%. Auburn ckt. 02: 394 AAAC loaded to 342 A or 64%. Laurel Hill ckt. 03: 1/0 AAAC loaded to 144 A or 62%. Voltage drop: Meets CHELCO's SDOC Additional Recommendations/Comments: See Note below.	see note above	Auburn Sub: 23,081 kW or 115% loaded Laurel Hill Sub: 5,800 kW or 77% loaded Conductor: 741 AAAC loaded to 552 A or 70% and 750 MCM UG loaded to 366 A or 80%. Voltage drop: Meets CHELCO's SDOC once voltage regulators are added downline from new load and project 300-RU10-01 is completed.	Auburn Sub: 23,463 kW or 117% loaded Laurel Hill Sub: 7,952kW or 107% loaded Conductor: 741 AAAC loaded to 584 A or 74% and 750 MCM UG loaded to 378 A or 83% Voltage drop: Meets CHELCO's SDOC Additional Recommendations/Comments: See Note below.	see note above

DOCKET NO. 100304-EU
EXHIBIT (JNS-4)
FEBRUARY 1, 2011 STUDY
PAGE 1 OF 2

[1] 2009 base, before CWP system improvements and 2014 grown models, both before and after CWP system improvements from CHELCO's 2011-2014 CWP completed in May 2010
[2] System Design and Operating Criteria (SDOC) that was approved by CHELCO staff on January 12, 2010.
[3] Before system improvements (BSI) and After System Improvements (ASI) are typical terms in CWPs. BSI is how the electric system is presently. ASI is how the electric system will be after the CWP projects are complete.

NOTE: For both the summer and winter 2014 ASI, the Auburn substation power transformer is carried to maximum capacity. Also, the lowside buswork at Auburn Substation circuit 03 is carried to its maximum capacity of 600A. It is for this reason that it is recommended that CHELCO and their G&T provider, PowerSouth EC evaluate substation options should Freedom Walk development be served by CHELCO and should it reach this estimated load of 4,700 kW. Options could be to upgrade the substation transformer at Auburn sub to a larger transformer or add a 2nd bank if there is room inside the substation or perhaps add a new delivery point to relieve the load on Auburn sub. Also, it is recommended that a 2nd circuit be constructed to help serve the load south of Auburn substation (if a new delivery point is not added nearby) to help serve the load south of Auburn substation and not exceed the rating on the lowside buswork and circuit breakers at the substation.

DOCKET NO. 100304-EU
EXHIBIT (JNS-4)
FEBRUARY 1, 2011 STUDY
PAGE 2 OF 2