Electric Utility | 2602 Jackson Bluff Rd. Tallahassee, FL 32304 | 850.891.4YOU (4968)

February , 2018

Ms. Penelope Buys
Florida Public Service Commission

Re: PSC Storm Hardening Report for the City of Tallahassee Electric Utility pursuant to Rule 25-6.0343, F.A.C for Calendar Year 2018.

Dear Ms. Buys:

Attached is the PSC Storm Hardening Report for the City of Tallahassee Electric Utility pursuant to Rule 25-6.0343, F.A.C. for calendar year 2018 which contains 12 pages.

If you have any questions regarding our submission, please feel free to contact me at (850) 891-5070 or email me at Steve.Dotson@talgov.com

Sincerely,

Steve Dotson
Engineering/Ops Manager
City of Tallahassee Electric Utilities
2602 Jackson Bluff Rd.
Tallahassee, FL 32304
(850) 891-5070
Steve.Dotson@talgov.com
Attachment

Cc: Rob McGarrah
Richard Ash

City of Tallahassee Electric Utility
Report to the Florida Public Service Commission Pursuant to
Rule 25-6.0343, F.A.C.
Calendar Year 2018

1) Introduction

a) City of Tallahassee Electric Utility

b) 2602 Jackson Bluff Road, Tallahassee, FL 32304-4408

c) Contact information:

Rob McGarrah
General Manager – Electric Utility
Office Phone # (850) 891-5534
Fax # (850) 891-5162
Rob.McGarrah@talgov.com

Or

Richard Ash
Assistant General Manager – Electric Power Delivery
Office Phone # (850) 891-5091
Fax # (850) 891-5058
Richard.Ash@talgov.com

Or

Steve Dotson
Operations Manager, Electric Power Delivery
Office Phone # (850) 891-5065
Fax # (850) 891-5058
Clyde.dotson@talgov.com

2) Number of meters served in calendar year 2018 – 121,814

3) Standards of Construction

a) National Electric Safety Code Compliance

The City of Tallahassee Electric Utility (City) has adopted the National Electric Safety Code as the standard for electric transmission and distribution system design and therefore designs electric transmission and distribution facilities to the latest edition of the National Electric Safety Code. During the calendar year 2018, the City designed new facilities according to the current version of the NESC. All distribution engineering standards, guidelines, policies, practices and procedures are in accordance with this Code. The City uses custom software to check pole loading to determine if the NESC requirements are met. Examples of the pole loading calculations are shown below.

Wind Load Calculations

(FOR NESC LIGHT LOADING CONDITIONS)

Wood Pole Selection Criteria	
Drop Down Lists	
Select Pole Species	Southern Yellow Pine
Select Grade Const.	Grade C
Select Pole Class	3
Select Pole Length	60
Select Burial Depth	7.0
Input Back Span	210
Input Forward Span	210
Select # Poles in Structure	1

Project Name:	COT Electric	Project #:	
Project Location:	Example 1 - Spec Manual page 21-103		
Station Number:		Engineer:	
Date:	2-28-16		

Maximum Allowable Resisting Moment of Wood Pole(s) (Net At Groundline)	Calculated Fibre Stress Imposed On Pole (At Groundline)	Calculated Maximum Windspan That May Be Utilized With This Pole Class and Given Loads	Pass/Fail Evaluation For Pole As Specified
84,438 (Ft-Lbs)	29743.8 (Ft-Lbs)	598.161 Feet	PASS

Conductors & Cable

Description		Conductor Selection	Number Of Conductors	Conductor Height (Ft)	Calculated Wind Span (Ft)	Calculated Wind Pressure (Lbs)	Calculated Moment (Ft-Lbs)
Primary Conductor Runs:		Select Conductor	Input Num.	Input Hgt.			
	1	4/0 AAAC BARE	3	42	210	667.7	23423.1
	2	4/0 AAAC BARE	1	34	210	186.9	6320.6
	3						
	4						
	5						
	6						
	7						
	8						
Secondary Conductor Runs:		Select Conductor	Input Num.	Input Hgt.			
	1						
	2						
	3						
	4						
	5						
	6						
Telephone Cable Runs:		Select Conductor	Input Num.	Input Hgt.			
	1						
	2						
	3						
	4						
	5						
	6						
CATV Cable Runs:		Select Conductor	Input Num.	Input Hgt.			
	1						
	2						
	3						
	4						
	5						
	6						

TRANSFORMERS

Description		Transformer Selection	Number Of Units	Midpoint Height (Ft)	Calculated Wind Pressure (Lbs)
Transformers:					
	1				
	2				
	3				

LINE EQUIPMENT

Description		Equipment Selection	Number Of Units	Midpoint Height (Ft)	Calculated Wind Pressure (Lbs)
Line Equipment:					
	1				
	2				
	3				

RISERS AND SWITCHES

Description		Riser/Switch Selection	Number Of Units	Midpoint Height (Ft)	Calculated Wind Pressure (Lbs)
Risers/Switches					
	1				
	2				
Note: For risers, use top of riser termina-tions as "midpoint height".	3				
	4				
	5				
	6				
	7				

Wind Load Calculations

(FOR NESC LIGHT LOADING CONDITIONS)

Wood Pole Selection Criteria		Project Name:	COT Electric	Project #:	
Drop Down Lists		Project Location:	Example 2 - Spec Manual page 21-103		
Select Pole Species	Southern Yellow Pine	Station Number:		Engineer:	Date: 2-26-16
Select Grade Const.	Grade C	Maximum Allowable Reciting Moment of Wood Pole(s) (Net At Groundline)	Calculated Fibre Stress Imposed On Pole (At Groundline)	Calculated Maximum Windspan That May Be Utilized With This Pole Class and Given Loads	Pass/Fail Evaluation For Pole As Specified
Select Pole Class	3				
Select Pole Length	45				
Select Burial Depth	6.5				
Input Back Span	250	76,886 (Ft-Lbs)	60674.6 (Ft-Lbs)	355.12 Feet	PASS
Input Forward Span	210				
Select # Poles in Structure	1				

Conductors & Cable			Number Of Conductors	Conductor Height (Ft)	Calculated Wind Span (Ft)	Calculated Wind Pressure (Lbs)		Calculated Moment (Ft-Lbs)
Description		Conductor Selection						
Primary Conductor Runs:		Select Conductor	Input Num.	Input Hgt.				
	1	668 AAAC BARE	1	37.5	230	333.9		12520.3
	2	668 AAAC BARE	1	34.2	230	333.9		11418.6
	3	668 AAAC BARE	1	30.9	230	333.9		10316.8
	4	668 AAAC BARE	1	21.87	230	333.9		7301.9
	5							
	6							
	7							
	8							
Secondary Conductor Runs:		Select Conductor	Input Num.	Input Hgt.				
	1	1/0 TPX	1	18.35	230	372.1		6828.0
	2							
	3							
	4							
	5							
	6							
Telephone Cable Runs:		Select Conductor	Input Num.	Input Hgt.				
	1							
	2							
	3							
	4							
	5							
	6							
CATV Cable Runs:		Select Conductor	Input Num.	Input Hgt.				
	1							
	2							
	3							
	4							
	5							
	6							

TRANSFORMERS			Number Of Units	Midpoint Height (Ft)		Calculated Wind Pressure (Lbs)		
Description		Transformer Selection						
Transformers:								
	1	TRANS: 50 KVA	1	26.3		83.2		2189.0
	2							
	3							

LINE EQUIPMENT			Number Of Units	Midpoint Height (Ft)		Calculated Wind Pressure (Lbs)		
Description		Equipment Selection						
Line Equipment:								
	1							
	2							
	3							

RISERS AND SWITCHES			Number Of Units	Midpoint Height (Ft)		Calculated Wind Pressure (Lbs)		
Description		Riser/Switch Selection						
Risers/Switches								
	1							
	2							
Note: For risers, use top of riser termina-tions as "midpoint height".	3							
	4							
	5							
	6							
	7							

b) Extreme Wind Loading Standards

For structures exceeding 60 ft. or more above ground, the City's construction standards, policies, guidelines, practices, and procedures are guided by the extreme wind loading standards as specified in Section 25 of the National Electric Safety Code for 1) new construction 2) major planned work, including expansion, rebuild, or relocation of existing facilities and 3) targeted critical infrastructure facilities and major thoroughfares. For structures, less than 60 ft. above ground, the City's construction standards, policies, guidelines, practices, and procedures are guided by the basic wind loading standards. There have not been any catastrophic events to date to indicate that stronger design considerations are necessary on the City's electric system.

c) Flooding and Storm Surges

The City is not a coastal community subject to flooding and storm surges, these types of standards, practices, guidelines, and procedures do not apply to the City's service territory.

However, the City of Tallahassee Electric Purdom Generation Station in St. Marks, Florida located on the St Marks River near the Gulf of Mexico is subject to storm surge & flooding. A comprehensive plan is in place to address flooding & storm surge within the "**Hurricane Preparation Evacuation and Recovery Plan for the Sam O. Purdom Generation Station**" This plan is designed to provide the Purdom plant personnel with guidance in preparing for, responding to and recovering from a hurricane and the impacts of wind and flooding that may occur to the plant and its vicinity. This plan shall be reviewed annually by the City for its adequacy. Every five (5) years, this plan shall be updated and submitted to the following agencies for review and comment.

- The Florida Department of Community Affairs
- City of St. Marks
- Wakulla County Emergency Management Office
- Leon County Emergency Management Office
- City of Tallahassee Emergency Management Office

The City is a member of the Florida Municipal Electric Association (FMEA), which is participating with all of Florida's electric utilities in storm hardening research through the Public Utility Research Center at the University of Florida. Under separate cover, FMEA is providing the FPCS with a report of research activities. For further information, contact Amy Zubaly, Executive Director, FMEA, 850-224-3314, ext. 1, or Azubaly@publicpower.com

d) Safe and Efficient Access of New and Replacement Distribution Facilities

All newly designed distribution facilities are placed within either distribution easements or are within the right of way limits on a road. The City discontinued the practice of rear lot construction many years ago. No distribution easements are allowed away from easily accessed areas for new construction. To the extent that alternatives exist for replacing other distribution facilities in a safe and efficiently accessed area, the City would consider all possibilities before leaving existing situations in less than desirable locations.

e) Attachments by Others

The Joint-Use agreements between the City and third-party(s) address terms and conditions of pole attachments. Since July 2006, the City has not issued a permit for pole attachment(s) without reviewing both the loading details and clearance details supplied by the joint user. Poles are replaced as the clearances and loading dictates. All loading is reviewed in compliance with the latest edition of the National Electric Safety Code.

4. Facility Inspections

a) The City's policies, guidelines, practices, and procedures for inspecting transmission and distribution lines, poles, and structures are as follows:

Pole Inspection/Treatment Program – Eight Year cycle

- The City's pole/structure inspection and treatment program was initiated several years ago and has been refined through each inspection cycle. The City's program is defined so that every **eight years** a new pole inspection and treatment cycle is initiated to inspect all the distribution and transmission wood poles and structures on the City's system over a two to three-year period. During these inspections, visual inspections are made of the City's concrete and/or steel structures with any deficiencies needing attention reported. The inspection/treatment program includes the following: (i) visual inspection for wood poles less than 10 years old (ii) sound and bore inspections for poles greater than 10 years old (iii) internal treatment and fumigant treatment as required (iv) reinforcement/replacement as required (v) assessment and evaluation of poles to determine whether they meet the applicable N.E.S.C. strength standard and (vi) record keeping of data for the GIS database. The City has found this inspection process, used typically throughout the industry, has resulted in high reliability and appropriate maintenance levels at reasonable cost.

Transmission Inspection Program – Five Year cycle

- The City performs a climbing and physical inspection of every transmission structure on its system at least every five years. A plan is developed from the inspections to make all the necessary repairs and/or refurbishments during periods of the year when load conditions permit the scheduling of line outages (typically fall and spring periods unless it is an emergency repair).

Infrared Inspections/Flying Inspection – Transmission and Distribution Facilities

- Infrared Inspections/Flying Inspections of Facilities – the Electric Utility and Tallahassee Police Department have jointly funded a Forward Looking Infrared Radar (FLIR) system that is utilized from the Leon County Sheriff's Office (LCSO) helicopters. In return for our funding the LCSO provides flight time for transmission and distribution inspections. The transmission system is routinely inspected twice per year. Other aerial inspections of different segments of the distribution and transmission system are performed as needed.

Technical Assessments

- Technical Assessments – after a significant electrical service interruption event has impacted the City of Tallahassee service territory and restoration of the City's customers has been completed, staff initiates technical and service related reviews:
  - Crews are assigned a specific circuits and areas to patrol and inspect to make sure that the system facilities are in normal operating condition.
  - Rapid Response Project Management Team (RRPTM) personnel, engineering staff and restoration supervisory staff meet to assess, review, and evaluate system performance, strength and areas with problems and prioritize issues/items that need to be addressed and/or improved upon.

Documentation/Record Keeping

- The City's Outage Management System (OMS) tracks all transmission and distribution facilities outages and identifies the cause of these facility interruptions. The interfacing of the OMS and Geographic Information System (GIS) allows OMS to track outages allowing the determination and classification of the cause as overhead or underground.
- GIS contains information concerning the system construction and has the capability for connectivity that will trace from the source point to the end-point of service to a specific customer. This aids in assessment of outage causes.
- A field inventory of the City's distribution facilities was completed at the end of 2015. The information obtained was used to update GIS data and graphics.

Post Mortem Interruption Reviews

- After every major outage on the City's system, Engineering & Operations Staff conduct a "post mortem" meeting to analyze the cause of the outage, the response to the outage and evaluate any changes or improvements that can be made to the system or the response process. Forensic analysis is utilized on an as-needed basis. The City has been consistently proactive in maintaining and improving the reliability and integrity of its distribution and transmission systems. In addition to the eight-year cycle pole inspection, treatment and replacement program, Infrared Inspection Program, five-year transmission inspection program, we have other ongoing programs such as the following that we perform for reliability purposes:
  - Line Clearance and Vegetation Management Program
  - Distribution, Transmission, and Substation Engineering Designs
  - Distribution System Inspection/Monitoring/Maintaining
  - Geographic Information System (GIS)/Outage Management System (OMS)
  - Training/Preparation
  - Emergency Operations & Disaster recovery Planning

b) Describe the number and percentage of transmission and distribution inspections planned and completed for 2018.

- **Transmission Poles:**

  - Transmission wood poles/structures inspections during climbing/physical inspections during FY2018: 0 (0 %).

  - Note: The current 8-year wood pole/structure treatment and inspection program cycle began in 2013 (February 2013). Next contracted wood pole/structure treatment and inspection program cycle will begin in FY2021.

- **Distribution Poles:**

  - Distribution none for FY2018. All poles were inspected from FY2013-FY2014

  - Note: The current 8-year wood pole/structure treatment and inspection program cycle began in 2013 (February 2013). Next contracted wood pole/structure treatment and inspection program cycle will begin in FY2021.

c) Describe the number and percentage of transmission poles and structures and distribution poles failing inspection in 2018 and the reason for the failure.

- **Transmission Poles:**
  - The annual FY2018 climbing inspections identified 0 (0%) poles/structures to be rejected due to wood decay or other deteriorating conditions such as woodpecker holes.

- **Distribution Poles:**
  - During FY2018 – 0 (0%) distribution poles/structures were rejected since there was no inspection that occurred during FY2018. All distribution poles/structures inspections were completed during FY2013 and FY2014 for the 8-year inspection cycle which began in 2013.

d) Describe the number and percentage of transmission poles and structures and distribution poles, by pole type and class of structure, replaced or for which remediation was taken after inspection in 2018, including a description of the remediation taken.

Replaced poles –

- During 2018 – 0 (0 %) transmission poles were replaced due to wood decay or other deteriorating conditions such as woodpecker holes.

Pole	Number	Percent of all pole inspected	Remediation Taken

- During 2018 – 887 Distribution poles/structures were replaced. As the City of Tallahassee is on an 8-year inspection/treatment cycle which was begun during FY2013 and was completed during FY2014, the poles listed below were inspected during FY2013 and FY2014 rather than during 2018.

Pole	Number	Percent of all pole inspected	Remediation Taken
25'-7	0	0.000%	N/A
30'-3	0	0.000%	N/A
30'-4	0	0.000%	
30'-5	0	0.000%	
30'-6	0	0.000%	N/A
30'-7	0	0.000%	N/A
35'-2	0	0.000%	N/A
35'-3	0	0.000%	N/A
35'-4	314	0.000%	Replaced with 35'-4
35'-5	0	0.000%	
35'-6	0	0.000%	N/A
35'-7	0	0.000%	N/A
40'-3	242	0.000%	Replaced with 40'-3
40'-4	0	0.000%	
40'-5	0	0.000%	
45'-2	0	0.000%	N/A
45'-3	167	0.000%	Replaced with 45'-3
45'-4	0	0.000%	
50'-2	87	0.000%	Replaced with 50'-2
50'-3	0	0.000%	
55'-2	41	0.000%	Replaced with 55'-2
60'-2	30	0.000%	Replaced with 60'-2
65'-2	6	0.000%	Replaced with 65'-2
70'-2	0	0.000%	N/A
75'-2	0	0.000%	N/A

During Hurricane Michael a total of 307 poles were changed.
35'-4 poles 78, 40'-3 poles 112, 45'-3 poles 61, 50'-2 poles 41, 55'-2 poles 7, 60'-2 poles 8.

- During 2018 – 0 poles were re-enforced.

5. Vegetation Management

a) Describe the utility's policies, guidelines, practices, and procedures for vegetation management, including programs addressing appropriate planting, landscaping, and problem tree removal practices for vegetation management outside of road right-of-ways or easements, and an explanation as to why the utility believes its vegetation management practices are sufficient.

The City's design standards exceed the National Electric Safety Code requirements for horizontal clearances to all transmission lines. This typically dictates easement widths that provide for larger clear zones from trees and other structures. The transmission system is managed on a three-year trim cycle with target clearance of 25'- 32' feet. These values take in account the movement of applicable line conductors under their Rating and all Rated Electrical Operating Conditions and the average growth rate for trees in this area, and the MVCD of 4 feet. City Line Clearance and Vegetation Management Program maintains an eighteen-month trimming cycle of all overhead distribution lines targeting six feet of line clearance beneath and on each side of the lines and the removal of hazard trees pursuant to the City Commission's established guidelines. City's vegetation management program also utilizes directional pruning, and the selective removal of those trees that cannot be maintained in a professional manner. When it is necessary to remove a protected tree for any reason we replace it with a "utility compatible tree". We also regularly remove those dead, diseased, and dying trees that represent the potential for an outage or endanger the public.

b) Describe the quantity, level, and scope of vegetation management planned and completed for transmission and distribution facilities in 2018.

- Transmission – All 230 KV lines were visually inspected annually for dead, diseased and dying trees as well as any obvious structural problems. All transmission Rights of Way and/or easements were mowed during FY2018 and will be mowed annually for the foreseeable future. Those lines that pass through residential areas will be mowed 3-4 times during the growing season to reduce customer complaints regarding "overgrown ROWs". The vegetation along the side of the lines running through rural areas is pruned with the use of a Jaraff mechanical trimmer. We began pruning the transmission lines in January of 2015 and finished in December of 2016. We began another three-year trim cycle in 2018 completing approximately 30% of the transmission system. The Jaraff crew skips over locations where the lines pass near or through residential areas because of the appearance of the trees after being mechanically pruned. Those locations are pruned with

the use of aerial lifts so that proper pruning cuts can be made leaving a more aesthetically pleasing appearance. However, whether mechanical or by hand, target clearance is twenty-five to thirty-two feet from the conductors. A broad-spectrum granular herbicide is applied to the base of all poles, steel structures, guy wires, and cross fences to eliminate the growth of underbrush and vines around the facilities.

- Distribution – Vegetation around approximately 1,037 miles of overhead distribution lines was managed during FY2017 and FY2018. This represents all overhead line miles on the system that have vegetation exposure. This is based on an eighteen-month trim cycle established in 1997 pursuant to City Policy. A target clearance of 6 feet based on ANSI A-300 standards is obtained each cycle. All line clearance maintenance work is performed by our contractor under a Firm Price contract, which requires that the entire overhead distribution system shall be completed within the 18-month trim cycle. We have also implemented an Enhanced Trimming program where limbs up to twelve feet above the primary voltage conductors are removed. In addition to pruning, all appropriate trees that have the potential to grow into the established clear zone of the lines will have been treated with a Tree Growth Regulator. The entire overhead distribution system has been treated five times since 1997. We began another cycle of Tree Growth Regulators in 2018.

The Public Utility Research Center has held two vegetation management workshops in 2007 and 2009. Through FMEA, the City of Tallahassee Electric Utility has a copy of their reports and will use the information to continually improve vegetation management practices. We will participate in future best-practice workshops if there is interest.

6. Storm Hardening Research

The City of Tallahassee Electric Utility is a member of the Florida Municipal Electric Association (FMEA), which is participating with all of Florida's electric utilities in storm hardening research through the Public Utility Research Center at the University of Florida. Under separate cover, FMEA is providing the FPSC with a report of research activities. For further information, contact Amy Zubaly, Executive Director, FMEA, 850-224-3314, ext.1, or Azubaly@publicpower.com.