GRU Storm Hardening Report
to the Florida Public Service Commission
Pursuant to Rule 25-6.0343, F.A.C.
Calendar Year 2012

1) Introduction

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2) Number of customers served in calendar year 2012

GRU serves Gainesville proper as well as Gainesville's urban fringe but does not serve the University of Florida campus. The number of electric customers served in 2012 averaged 92,265 which can be broken down by class as follows:

Residential Customers:	82,128
Non-Residential Customers:	10,428
Total:	92,556

3) Standards of Construction

(a) National Electrical Safety Code Compliance

GRU's Material and Construction Standards are continuously maintained and updated to ensure compliance with the applicable version of the National Electric Safety Code (NESC). Construction standards, policies, guidelines, practices and procedures for electric distribution facilities installed prior to December 16, 2012 adhered to the requirements of the version of the NESC in effect at the time of installation. Electric distribution facilities installed subsequent to December 16, 2012 complied with the 2012 version of the NESC.

(b) Extreme Wind Load Standards

GRU's Material and Construction Standards are guided by the extreme wind loading requirements specified by Figure 250-2(d) of the 2012 edition of the NESC for 1) new construction, 2) major planned work, including expansion rebuild or relocation assigned on or after December 16, 2012, and 3) targeted critical infrastructure facilities and major

thoroughfares taking into account political and geographical boundaries and other applicable operational considerations. Electric distribution facilities installed subsequent to December 16, 2012 comply with the extreme wind loading standards of the 2012 version of the NESC.

(c) Flooding and Storm Surges

GRU is located in north central Florida, roughly equidistant to both coasts. GRU's electric distribution facilities are not subject to storm surges and have limited exposure to flooding. Where there has been significant flooding GRU evaluates the opportunity to relocate facilities, underground and overhead, to more secure locations.

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

Electrical construction standards, policies, guidelines, practices, and procedures at GRU provide for placement of new and replacement distribution facilities so as to facilitate safe and efficient access for installation and maintenance.

GRU has instituted a Continuous Improvement Program. The program identifies the worst performing devices, circuits and most compromised primary voltage underground cable. Outages are reviewed on a daily basis to determine if any device has a chronic problem. The renewal and/or replacement of problem devices are prioritized based on the anticipated customer service improvement and best value (cost/benefit ratio) to be realized. As a result of this effort a comprehensive improvement plan is developed and implemented.

Also, each distribution circuit's performance is analyzed annually and the worst performing circuits are identified based on customer impact and cause. A plan is developed to improve the circuit's performance by reducing the number and severity of the service interruptions. The work is prioritized based on the anticipated customer service improvement and best value (cost/benefit ratio) to be realized..

As part of this program, difficult access facilities are evaluated to determine if they can be relocated. Typically GRU has found it very difficult to relocate back lot facilities along the roadway due to the existing tree canopy. Therefore, when it is not possible to relocate such facilities, the performance problems are mitigated by installing new poles of increased strength (class) and aerial cable where necessary to improve the reliability of the system and to harden the electric system. GRU utilizes motorized and non-motorized back lot construction equipment that facilitates access to and repair of limited access facilities. Also, long distribution system laterals are reconfigured and, where possible, shortened to improve system reliability.

The Continuous Improvement Program also includes evaluating the life expectancy of primary voltage underground cables. Cables are tested and, where possible, the insulation is restored to extend the life of the cable by 30 years. Cables that fail the initial test are replaced. This is a proactive program to increase the life of older URD cables and reduce the number of service interruptions due to cable burnouts. During the testing phase all underground cable connections and transformers are checked and renewed

and/or leveled, as necessary. During 2012, 17+ miles of primary cable insulation was renewed, 5+ miles of primary cable were replaced, 160+ distribution transformers were replaced, and 360+ secondary pedestals (including all connections) were replaced, improving service to approximately 5,000 utility customers.

Another component of the Continuous Improvement Program is the replacement and attendant redesign of the URD feeder system, where subsurface, manhole-installed switchgear, where possible, is being reconfigured with surface-mount switchgear. Each replacement will result in easier and safer access to the gear during routine maintenance and during outage restoration activities and an associated reduction in outage duration.

The Transmission Structure Hardening Program for 2012 consisted of replacing 138 kV post insulators with suspension brace post insulators on 16 transmission structures.

A distribution automation plan has been adopted which enables the utility to sectionalize certain distribution circuits. During storm situations GRU can maintain service to as many customers as possible by remotely sectionalizing faulted circuit segments.

(e) Attachment by Others

Electrical construction standards, policies, guidelines, practices, and procedures at GRU include written safety, pole reliability, pole loading capacity, and engineering standards and procedures for attachments by others to the utility's electric transmission and distribution poles.

GRU requires pole attachment agreements for entities that desire to attach to its structures. The agreements stipulate that such entities must submit a permit request to GRU prior to making any attachments, with the exception of attaching a service drop cable. Whenever a pole proposed for joint use is of insufficient height or strength for the existing or proposed attachments, the pole is replaced. There is an additional requirement imposed on such entities to install whatever guy and anchor system is necessary to sustain any unbalanced load their attachment places on the structure. Dependent upon the nature and age of GRU's pole attachment agreements, some agreements require that the permit request include an engineer's determination that the impact of the proposed attachment will satisfy the applicable NESC requirements.

4. Facility Inspections

a) Policies, guidelines, practices, and procedures for inspecting transmission and distribution lines, poles, and structures.

GRU has had a comprehensive and periodic pole inspection/treatment program since 1992.

Overview

- The inspection cycle has been established at eight (8) years.

- The inspection method is to sound and bore every pole and perform a complete visual inspection for cracks, splitting and obvious decay.
- The pole base is exposed (where possible) to 18 inches to inspect for indications of decay. Where such exposure is not possible, the pole is treated with MITC-fume, a pesticide that will migrate throughout the pole to prevent rot, decay and insect damage.
- Poles less than ten (10) years old are not treated.
- Pole treatment is documented by Pole Inspection Program Maps and in electronic data files.

Transmission

GRU visually inspects all transmission lines for vegetation danger trees twice each year and following major storm events. GRU has detailed inspection and ground line treatment performed on all wood transmission poles following an 8-year cycle. The inspection and treatment of these poles consists of a sound and bore to locate unseen decay pockets and a full visual inspection. The ground line inspection includes exposing the pole to a depth of 18 inches below ground line. After inspection any decay is removed and a preservative paste is applied to prevent future decay. Transmission lines are also treated with MITC-fume to prevent internal decay as well. MITC-fume is a pesticide that migrates throughout a pole to prevent rot, decay and insect damage. Visual inspections also provide information about other items such as damaged hardware, woodpecker holes, cracks, splits and decayed pole tops. GRU replaces all rejected poles within one year of the inspection date. Rejected poles determined to be a "priority" are replaced immediately.

Distribution

GRU performs a detailed inspection and ground line treatment on wooden distribution poles over an 8-year cycle. All wood poles 10 years of age and older are inspected and treated over the cycle. The inspection and treatment of these poles consists of sound and bore to locate unseen decay pockets and a full visual inspection. The ground line inspection includes exposing the pole to a depth of 18 inches below ground line. After inspection any decay is removed and a preservative paste is applied to prevent future decay. Distribution poles that cannot be fully ground line inspected are treated with MITC-fume to prevent internal decay. Visual inspections also provide information on other problems such as damaged hardware, Woodpecker holes, cracks, splits and decayed pole tops. GRU replaces all rejected poles within one year of the inspection date. Rejected poles determined to be a "priority" are replaced immediately.

b) Number and percentage of transmission and distribution inspections planned and completed for 2012.

No transmission pole inspections were scheduled for 2012. GRU planned 2,999 distribution pole inspections and completed a total of 3,204 (107% of planned work).

c) Number and percentage of transmission poles and structures and distribution poles failing inspection and the reason for the failure.

No transmission poles were planned or identified for replacement. Of the 3,204 distribution poles inspected, 11 poles were replaced (failure percentage 0.03%). The failures were caused by shell rot, heart rot, rotten butt, carpenter ants and decay.

d) 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, including a description of the remediation taken.

Transmission Poles
None inspected.

Distribution Poles

Height/Class	# in Class	% of Total	Remediation
30/5	1	9	Replaced
30/6	3	27	Replaced
35/2	1	9	Replaced
35/5	2	19	Replaced
35/6	0		
40/3	0		
40/4	0		
40/5	1	9	Replaced
45/3	0		
45/4	0		
50/3	3	27	Replaced
55/3	0		
60/1	0		

5. Vegetation Management

a) 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.

GRU's Vegetation Management work group establishes and maintains the clearances required to reliably operate approximately 560 miles of overhead distribution lines on a three-year rotating cycle. The work plan each year is defined, scheduled and executed by specific distribution circuits which range in size from approximately two to twenty-five miles in length. Prioritizing of these circuits is based upon reliability and visual inspections. GRU completed its 7th maintenance cycle in 2012. The vegetation management program includes maintenance of primary, secondary and service drops. We also have an aggressive herbicide program to reduce the density of undesirable vegetation as well as a tree growth regulator program to address specific problems. As much as it is possible to identify potentially

hazardous trees from beyond the limits of the right-of-way/easement, we have had a program to negotiate with the property owner to remove these trees and provide the owner with a voucher redeemable for low growing species if need be.

The distribution vegetation maintenance program is based upon nationally recognized standards of tree care and vegetation management practices and adapted to Gainesville's environment and specific operating concerns.

These standards and practices include, but are not limited to, the following:

- National Electric Safety Code
- ANSI A300 (Tree care - standard practices)
- ANSI Z133.1 (Tree care - safety practices)
- Shigo - Pruning trees near electrical utility lines
- Shigo - Tree Pruning
- Matheny and Clark - Evaluation of hazardous trees in urban areas

Components of the distribution maintenance program are:

- Routine utility tree pruning
- Selective tree removals based upon hazardous conditions
- Selective use of herbicides
- Selective use of tree growth regulators
- Wood chip recycling

Appropriate Planting

GRU has produced a “Plant the Right Tree in the Right Place” brochure with a list of compatible tree species. By compatible we mean that these species may be planted within ten feet of an overhead power line. The mature height of these species is such that they should never reach GRU facilities.

GRU maintains a number of different types of ground level electric facilities. The two that we are concerned with are switchgear and pad-mount transformers. It is imperative that customers do not plant shrubs and small trees directly in front of these facilities. Each structure has a decal that reflects the above recommendations.

We have also developed a set of tree planting guidelines for use by developers and engineers as to appropriate species to be planted within prescribed distances from our facilities.

The City of Gainesville enjoys an especially dense tree canopy, one that is clearly favored by our community and its citizens. As a neighbor and responsive municipal electric utility, GRU has long acknowledged our obligation to serve our customers in this environment in the most effective yet least intrusive manner. Consequently, our ratio of underground to overhead electric distribution facilities is among the highest in the State.

GRU's Vegetation Management program was developed over time with a care and control agenda that has been recognized as a model program for electric utilities. GRU records and continually monitors vegetation-related service interruptions. GRU records tree-related outages in one of three categories: **Tree Preventable** – vegetation to be maintained within our easements; **Tree Non-Preventable** – vegetation from outside of our easements; and **Vines**. Tree preventable service interruptions accounted for only 0.6% of all service interruptions in 2012 (6 of 961 total outages).

Transmission Program

GRU was the subject of a North American Electric Reliability Council (NERC) performance and readiness audit in April 2006 where GRU's Vegetation Management Program received a Potential Example of Excellence (PEOE).

Their report stated ***"GRU has a well documented and comprehensive vegetation management policy, program and knowledgeable staff. The GRU vegetation management program and staff oversight is identified as a potential example of excellence for its comprehensive, detailed procedures and performance of the program itself."***

An FRCC Spot Audit was conducted in the latter half of 2009. The results found the vegetation management program was in compliance with all requisite requirements.

b) Quantity, level, and scope of vegetation management planned and completed for transmission and distribution facilities.

GRU's Transmission and distribution right-of way maintenance of vegetation is a routine and on-going, year-round program accomplished through a utility approved contractor directed and inspected by GRU Forestry professionals and Utility management staff.

Transmission System Information
76.2 corridor miles @138 kV
2.5 corridor miles @ 230kV (falls into NERC Standard FAC-003-1)
GRU applies NERC Guideline FAC-003-1 over our entire transmission system.

Transmission Inspections
The program calls for semi-annual inspections (spring and fall) to identify conditions which would pose a near-term threat to the operation of the system such as insect infestations or any other factor that would impact tree mortality or structural integrity. The program also calls for a complete inspection immediately following any significant events such as hurricanes, tornadoes or fires.

Inspections cover 100% of the transmission system and are conducted by GRU Vegetation Management personnel.

Spring Inspection Summary: January - March, 2012
Inspected 100% of Transmission system.
Results: No work needed.
Follow-up activities: None needed.

Fall Inspection Summary: September, 2012
Inspected 100% of Transmission system.
Results: Eleven trees identified for removal.
Follow-up activities: Work orders issued and completed by contract tree crews.

Transmission Maintenance
GRU adhered to its five-year transmission system floor maintenance cycle in 2012 and treated four transmission system corridors as programmed. The floor of the transmission system is maintained by scheduled herbicide application which is selective and targeted to those species which are capable of growing to a mature height that would interfere with the transmission system conductors. Low growing species, except for the access areas, were not discouraged from growing. The program was designed to incorporate the research from Bramble and Burn's Gamelands 33 project which was a long-term study on rights-of-way treatments; Project Habitat principles and ANSI A300 Part 7 Integrated Vegetation Management for Electric utilities Rights-of-way.

Distribution Maintenance
GRU adhered to its three-year distribution system maintenance cycle in 2012 and trimmed approximately 196 circuit miles of the 200 miles programmed along with an additional 12 circuit miles associated with renewal and replacement work.

Summary
GRU's cycle-based line clearance practices embrace the philosophy of storm hardening on critical feeders, double circuits and three-phase backbone circuits. Our trimming best practices include targeting dead, diseased or damaged trees, the removal of overhanging branches and increased tree clearance. Out-of-cycle activities include frequent patrols/year round monitoring targeting danger trees. GRU continuously reviews and improves its vegetation maintenance programs. This effort is realized in part by evaluating and using information presented in forums such as the Public Utility Research Center vegetation maintenance conference which was held January 26-27, 2009. That report was made available to GRU by the FMEA.

6. Storm Hardening Research

GRU 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 Barry Moline, Executive Director, FMEA, 850-224-3314 or bmoline@publicpower.com.