TECO
TAMPA ELECTRIC

BEFORE THE

FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. 070297-EI

IN RE: Petition for Approval of

Tampa Electric Company's

2007-2009 Storm Hardening Plan

REBUTTAL TESTIMONY

OF

REGAN B. HAINES

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

PREPARED REBUTTAL TESTIMONY

OF

REGAN B. HAINES

Q. Please state your name, address, occupation and employer.

A. My name is Regan B. Haines. My business address is 702 North Franklin Street, Tampa, Florida 33602. I am employed by Tampa Electric Company ("Tampa Electric" or "company") as Director, Engineering in the Energy Delivery Department.

Q. Are you same Regan B. Haines that filed Direct Testimony in this docket on August 24, 2007?

A. Yes.

Q. Have you prepared under your direction and supervision an exhibit in support of your rebuttal testimony?

A. Yes. Exhibit ____ (RBH-2) consisting of four documents was prepared under my direction and supervision in support of my rebuttal testimony.

Q. What is the purpose of your rebuttal testimony in this proceeding?

A. The purpose of my rebuttal testimony is to address assertions in opposition to certain aspects of Tampa Electric's Storm Hardening Plan ("Tampa Electric's Plan" or the "Plan") made by Sanford C. Walker on behalf of Verizon Florida LLC ("Verizon") and by Michael T. Harrelson on behalf of Florida Cable Telecommunications Association ("FCTA") in testimony filed on September 7, 2007.

Rebuttal of Verizon Witness Walker

Q. Please summarize the portions of Mr. Walker's testimony you will address.

A. Mr. Walker's testimony at pages 4 - 5 narrowly objects to three aspects of Tampa Electric's Plan: (1) pole inspection process; (2) pole attachment audits program; and (3) upgrading Class C poles to Grade B poles.

Q. What is the status of Tampa Electric's pole attachment inspection process?

A. Tampa Electric's pole inspection process has been approved by this Commission in Docket No. 060531-EU, in re: Review of all Electric Utility Wooden Pole Inspection Programs. Order 06-0778 issued September 18, 2006 specifically stated that:

> In Order No. PSC-06-0144-PAA-EI we required that each plan include a procedure to ensure the inspection of collocated poles.
>
> * * *
>
> Each electric IOU has included in its plan a procedure to ensure the inspection of collocated poles.

Order 06-0778 further required each plan to include a procedure to ensure program enforcement. The Commission held that, "Each electric IOU has included in its plan a procedure to ensure enforcement of the inspection program. This is accomplished through vendor audit and/or the utility's quality control program. This is consistent with the requirements of the order."

Q. What was the basis of the Commission's order requiring the implementation of a pole inspection program?

A. Order No. 06-0144 issued February 27, 2006 expressed specific concern about pole loadings due to pole attachments stating:

> Factors such as electric fixtures and non-electric pole attachments impose additional strength requirements that are considered at the time the pole is installed.

The order observed that:

> . . . many pole attachments occur well after the date of pole installation . . . we believe that third parties have completed pole attachments to electric IOU poles that were done without full consideration of the NESC requirements . . . thus we find that wood pole strength inspections under such conditions require both a remaining strength assessment as well as a pole attachment loading assessment.

The Commission's inspection methodology included in the pole inspection order specifically requires the company to conduct pole attachment loading assessments on joint use

poles.

So, in summary, the Commission identified pole attachments as a significant target of pole inspection because of unnoticed pole attachments which were not engineered to be added to the pole prior to the completion of the attachments.

Q. Has the Commission expressed concern about pole attachments in other dockets?

A. Yes. In its April 25, 2006 Order 06-0351 in Docket No. 060198-EI, the Commission ordered electric utilities to file a ten point storm preparedness plan. Initiative number two of the plan required an audit of joint use attachment agreements. On June 1, 2006, Tampa Electric filed its ten point plan including its plan for audits of pole attachments. Order 06-0781 issued September 19, 2006 concluded:

> We find that each of the utility's plans for auditing joint use attachment agreements include strength assessment and are consistent with the intent of Order No. PSC-06-0351-PAA-EI.

The Commission's rules adopted January 16, 2007 in Order 07-0043-FOF-EU issued in Docket No. 060172-EU likewise specifically expressed concern about pole attachments. Specifically Rule 26-06.0342(5) Attachment Standards and Procedures saying these standards should meet or exceed the NESC and:

> . . . assure, as far as reasonably practicable that third party facilities attached to electric transmission and distribution poles do not impair electric safety, adequacy, or pole reliability; do not exceed pole loading capacity; and are constructed, installed, maintained and operated in accordance with generally accepted engineering practices for the utility's service territory.

This standard is essentially that nothing should be attached to an electric utility pole that is not engineered to be there in advance. This is a sound standard specifically addressing the safety and reliability of electric utility systems in this state.

Q. What is the relationship of Tampa Electric's Plan to the Pole Inspection Plan, the ten point initiative and the rules you have discussed?

A. The Plan is part of and consistent with the multifaceted effort by the Commission to ensure the safety and reliability of electric utility systems and is consistent with the Pole Inspection Program and the Pole Attachment Audit Plans. The Plan references pole inspection and pole attachment programs to demonstrate the context of these programs is consistent with the Plan's intent to harden Tampa Electric's system; however, these programs are separate from the Plan. The details of the Pole Inspection Program and the Pole Attachment Audit are beyond the scope of Tampa Electric's Plan and this docket.

Q. What specific objection does Verizon have with Tampa Electric's pole inspection process?

A. Verizon objects to the pole inspection process whereby Tampa Electric conducts a preliminary stress test to determine if a pole is overloaded and, if so, to conduct a pole loading analysis. Where the pole is overloaded the course of the overload is determined. If the overload is an attachment by an attacher who had no

permit from Tampa Electric, it would be required to either remove the attachment or pay for the corrective action.

Q. What is your response to Verizon's objection?

A. Verizon is attempting to relitigate matters that have long been decided and are beyond the scope of this proceeding. Tampa Electric's pole inspection process is in compliance with this Commission's Order 06-0144 issued on February 27, 2006 which ordered Tampa Electric to engage in an eight year pole inspections process. One of the principal concerns expressed by the Commission's Order 06-0144 was unnoticed and unauthorized attachments which could cause poles to be overloaded. The Commission's order states:

> We believe that third parties have completed pole attachments to wood poles that were done without full consideration of the requirements of the NESC requirement. Thus, wood pole strength inspections under such conditions should require both remaining strength assessments as well as pole loading assessments.

Tampa Electric's pole inspection plan was filed and approved in Order No. 06-0778 issued September 18, 2006. The Commission found that Tampa Electric's Pole Inspection Plan reasonably addresses the concerns expressed by the Commission namely, that an inspection of poles with attachments should be made and corrective action taken, if necessary.

Q. Mr. Walker discusses Section 7.5.1 and 8.7 of Tampa Electric's Plan which provides that if a party causing the overload is an attacher that did not obtain a permit from Tampa Electric, it would be required to remove the attachment or pay for the required corrective action. Please comment.

A. Section 7.5.1 discusses third party benefits and impacts and asserts that there will be minimal impact to third party attachers as a result of Tampa Electric's Plan.

Section 7.5.1 then states the largest impacts to attachers will be under the Pole Inspection Program which was previously approved and is being implemented. This section also describes the tests conducted in the pole inspection.

Section 7.5.1 also discusses the ongoing audits of pole attachments pursuant to initiative two in Tampa Electric's Ten Point Plan previously approved by the Commission.

In the situation where a third-party has attached to a pole without receiving approval from Tampa Electric and an overload exists, that unlicensed attacher will have cost responsibility. In this case where an unlicensed attachment exists and the pole inspection indicates that it is causing an overload, that attacher will have the option of paying for the make-ready required to bring the pole into compliance with code and company standards or vacating the pole. This make-ready likely should have been done when the attachment was made and would have been the cost responsibility of that attacher prior to receiving a permit at that time. This approach is fair and reasonable for all third party attachers and Tampa Electric's customers given the high number of unreported attachments experienced by the company. The entity that is not licensed or permitted to be on the pole that is causing the overload should have the responsibility of remedying the problem.

Tampa Electric utilizes all information available to

determine which attacher was last on the pole and is likely causing the overload. In the situations where the company does not have adequate records to determine the order in which the third parties attached to the pole, the company would work with the third party attachers involved and make logical assumptions based on the timing of the presence of each third party in that area and the likeliness of when the third party would have attached. This is the same approach Tampa Electric has historically taken, with agreement from all third party attachers, and it has work successfully in the past.

Q. Mr. Walker also addresses Section 8.8 of Tampa Electric's Plan describing the Pole Attachment Audit Plan. Please comment on Mr. Walker's assertions.

A. The Pole Attachment Audit Program was previously approved by the Commission. The discussion in Section 8.8 is included for completeness. This section accurately describes the actions now being taken pursuant to the Commission's Order 06-0351 requiring pole attachment audits. Verizon does not oppose the attachment audits or pole inspections but contends that the parties' responsibilities for addressing those situations should be determined under joint use agreements not through

terms imposed through its Storm Hardening Plan. Tampa Electric agrees with Verizon's philosophy in principal and will more fully address Verizon's assertion in its post-hearing brief.

Rebuttal of FCTA Witness Harrelson

Q. Please comment in general on the rebuttal testimony of Michael Harrelson filed on behalf of FCTA.

A. Mr. Harrelson appears to accept the basic approach taken by Tampa Electric in its Plan but disagrees with a number of the Plan's details. He concludes that Tampa Electric's Plan has too great an impact on CATV providers because of his disagreement with the details. I find some of his comments to be quite surprising in view of the extensive dialog Tampa Electric has had with all of its attachers, the extensive opportunity for input provided, and the extensive detailed responses provided in answer to requests for information.

Q. Mr. Harrelson at page 9, lines 18-19 complains that Tampa Electric's Plan does not contain the appropriate level of detail. How do you respond?

A. First of all, Tampa Electric's Plan is relatively simple and straight forward. Tampa Electric plans to continue building to Construction Grade B and plans to undertake two specific targeted extreme wind pilot projects upgrading facilities serving targeted critical infrastructure to construction Grade B, extreme wind. Tampa Electric's Plan also describes certain other specifically described upgrades. FCTA does not have any objection to these other upgrades but continues to complain about the level of detail provided with respect to the two pilot projects.

This complaint is not well founded.

Tampa Electric has had meetings with the attachers, answered detailed questions and has offered to ride the routes with representatives of attachers that FCTA represents. Maps identifying the circuit routes have been provided on more than one occasion. The routes are clearly defined, pole counts have been provided and attachers can clearly determine facilities that will be affected. FCTA members have not availed themselves of the opportunity to ride the affected circuits with Tampa Electric engineering personnel; however, with the maps previously provided, FCTA members could embark on a self-

guided tour and come to a definitive conclusion as to the facilities affected by Tampa Electric's pilot projects.

FCTA continues to complain that Tampa Electric has not engineered these projects in detail. First, these projects have not yet been approved and second, these details will be provided in the process within the process to which all parties have agreed. FCTA's continuing complaints about detail is unfounded. In fact, FCTA's assertion on page 9, lines 24-25 that Tampa Electric has not satisfied its obligation in good faith to accommodate input from attachers is not only inaccurate but somewhat outrageous in view of the dialog and data exchange which has occurred.

Q. FCTA asserts on page 9, lines 19-20 that certain aspects of Tampa Electric's Plan are not prudent, practical or cost-effective. Please comment on that assertion.

A. The "certain aspects" of Tampa Electric's Plan which Mr. Harrelson attacks appear to be implementation details of Tampa Electric's Plan to continue upgrading its system to construction Grade B. The principal concern appears to be Tampa Electric's Plan to change out poles which may meet construction Grade C but not construction Grade B.

Q. How do you respond to the various arguments Mr. Harrelson advances with respect to upgrading construction Grade C poles to construction Grade B?

A. Tampa Electric adopted the NESC construction Grade B criteria as its construction standard in the 1970s. Based on the loading analysis that has been performed in 2006 and 2007, only two percent of all poles analyzed during that time have failed the loading analysis. Tampa Electric believes that the basis for why its system performed so well during the hurricanes experienced is the construction standards instituted by the company. Any poles that are found to not meet construction Grade B standards are considered a weak link on the system and create a greater risk of failure during an extreme wind event. These out of compliance poles will be upgraded to meet current standards when identified, whether through a maintenance program, system expansion, or new customer related work.

Q. Mr. Harrelson asserts that construction Grade B is stronger than construction Grade C but not twice as strong. How do you respond?

A. Mr. Harrelson concedes that construction Grade B is

stronger than construction Grade C. The precise engineering calculation of how much stronger is not particularly meaningful. Nevertheless construction Grade B compares with construction Grade C as follows:

Tampa Electric contends that the load factors (1.75 and 2.5) and the strength factors (.85 and .65) used by the NESC to determine the loadings for construction Grades C and B (Table 253-1 and 261-1A) respectively, indicate that construction Grade B is in fact 87 percent stronger than construction Grade C or (1.87 times construction Grade C). This is also supported by the testimony of Dr. Lawrence Slavin filed on September 7, 2007 on behalf of Verizon (See Figure 1, page 21 of Dr. Slavin's testimony).

As can be seen, construction Grade B is an excellent fit with the extreme wind experienced in Tampa Electric's service territory over the last 150 years.

Q. Mr. Harrelson asserts on page 11, lines 14-15 that much of Tampa Electric's distribution system is not presently built to construction Grade B. How do you respond?

A. The precise determination of how much of Tampa Electric's

system is now built to construction Grade B is not particularly meaningful. Tampa Electric agrees that some of its system is not now built to construction Grade B. The construction Grade C poles are the weak link in Tampa Electric's system. Tampa Electric is proposing to accelerate the replacement of these poles under its Plan. Under any circumstances, due to the long life of poles used in Tampa Electric's system, it will take a considerable amount of time to complete an upgrade of any system. Hardening the system is the objective of this proceeding and Tampa Electric's Plan to upgrade construction Grade C poles to construction Grade B is an important part of this Plan for which Tampa Electric seeks this Commission's approval.

If Mr. Harrelson is correct that "much of the TECO distribution system is not presently built to Grade B standards" that supports Tampa Electric's Plan to accelerate the upgrade of construction Grade C poles to construction Grade B.

However, based on the 55,000 poles inspected by the company in 2006 and year-to-date 2007, only two percent of these poles have failed to meet the Grade B loading criteria. While only joint use poles have been analyzed,

it is the company's experience that these poles will have the greatest loading and the highest chance of not meeting loading criteria. While the company has stated that it believes the construction Grade B standard was implemented in the early 1970s, this does not necessarily mean that all construction prior to that point is below construction Grade B standard.

Q. Mr. Harrelson on page 18 complains that Tampa Electric's deployment strategy is not in sufficient detail. How do you respond?

A. Mr. Harrelson's assertions are incorrect. As previously discussed, Tampa Electric has provided a great amount of detail and attachers know exactly which circuits, poles and facilities will be affected by Tampa Electric's pilot projects. In addition, the process within the process which has been agreed to by all parties should remedy all need for any further detail.

Q. Mr. Harrelson on pages 19-20 discusses the cost and benefit of Tampa Electric's Plan to attachers. How do you respond?

A. Mr. Harrelson asserts that cable operators will incur

significant increased costs in pole attachment rents and make ready costs as a result of the company's Plan but that the FCC prescribes these rents and costs. First of all, any increased costs due to the implementation of Tampa Electric's Plan to conduct targeted extreme wind pilot projects is not significant. Second, attachers' costs incurred as a result of pole inspections or pole attachment audits are not at issue here. These programs are approved and underway. Third, the impact on pole rental rates will occur due to implementation of a FCC approved formula. Finally, the pole rental rate is under the jurisdiction of the FCC.

FCTA's continuing reference to the effect on pole rentals and FCC jurisdiction is somewhat schizophrenic. The proper approach for this Commission is to consider the measures which it considers will make the electric system safe and reliable. The FCC formula will determine the pole rental rate.

It is obvious that efforts to improve the reliability of electric infrastructure and to make that system more resilient to storms will be costly. It is also obvious that a strengthened system will benefit not only electric customers but customers of telephone and cable services

as well.

Q. Mr. Harrelson asserts on page 21 that he is concerned that while inspection and maintenance programs can be a useful deployment strategy, Tampa Electric will use these programs to unfairly shift blame and costs to attachers. How do you respond?

A. The details of Mr. Harrelson's concerns with respect to maintenance programs are set out at page 23, line 12 through page 29, line 19. These concerns all relate to Tampa Electric's Pole Inspection Program which is not at issue here. Further, the concerns expressed are not valid. These concerns are summarized as follows: (1) is guying appropriately considered in the pole loading analysis; and (2) are the methods employed to assign responsibility and correction costs to attachers appropriate.

First, it is apparent that Mr. Harrelson has very limited knowledge of the PoleForeman, Ocalc, or LD Field software tools utilized by Tampa Electric and its contractors to perform pole loading analysis. All of these applications consider the items questioned by Mr. Harrelson, including the "guying effects of other lines, cables, and guys on

poles." Second, the only situation where an attacher will have cost responsibility is when a third party has made an attachment without receiving approval from Tampa Electric. In the case where an unlicensed attachment exists and the pole inspection indicates that it is causing an overload, that attacher will have the option of paying for the make-ready or vacating the pole. Several but not all of Tampa Electric's attachment agreements require the attacher to maintain adequate records for the company's review when necessary to clear up these types of disputes.

Q. Please discuss Mr. Harrelson's concerns expressed with respect to strength assessments under its Pole Inspection Program set out on pages 24 - 29.

A. First of all, these concerns all relate to Tampa Electric's Pole Inspection Program which is already approved and underway. Second, the concerns about the methods employed to conduct the strength assessment are unfounded. These concerns can be summarized as follows: (1) is the basic process of inspection reasonable (page 24, lines 2 - 25); (2) are the inspector's criteria appropriate (i.e., does PoleForeman and LD Field the computer programs used to make strength assessments,

consider guying effects of lateral lines on the pole) (page 25, line 5 through page 27, line 5); and (3) is the performance (page 27, lines 10-14) of loading analysis only on joint use poles justified?

Q. Please discuss Tampa Electric's basic approach to loading analysis conducted in Tampa Electric's Pole Inspection Program.

A. Mr. Harrelson's concerns about Tampa Electric's approach to loading analysis are expressed on page 24. Basically Mr. Harrelson is saying FCTA is uncomfortable with the scrutiny of pole attachments. As previously noted, the Commission on several occasions prior to this docket has expressed serious concerns about unnoticed and unauthorized attachments that may be causing overloads. The process Tampa Electric employs: (1) reasonably addresses the Commission's concern; and (2) is undertaken by order of the Commission in a prior docket. This process is straight forward and effective. First a visual inspection is made of all joint use facilities. Second, joint use poles which fail a visual inspection undergo a more detailed loading study: (1) a preliminary stress test is first conducted by a contractor; and (2) a more detailed loading analysis for poles that fail the

preliminary test is performed.

This Pole Inspection Plan is entirely reasonable.

Q. Mr. Harrelson complains that Tampa Electric has declined to share the visual inspection criteria or the result of the comprehensive analysis. How do you respond?

A. Mr. Harrelson "strongly objects to the approval of the Plan until the inspection criteria and comprehensive analysis are provided and evaluated by FCTA." First, the visual inspection and comprehensive analysis is a part of the Pole Inspection Program that is already approved and underway. Second, Tampa Electric has no objection to FCTA's access to the inspection criteria and results of the comprehensive analysis. In Tampa Electric's response to the FCTA's First Set of Interrogatories Nos. 25 and 27, the audit pilot that was discussed is the pole attachment audit only. Tampa Electric is not performing loading analysis on poles during the pole attachment audit. Loading analysis is being performed as part of the company's Pole Inspection Program. The company's pole attachment audit is underway and the company has fully disclosed to its attachers the scope and cost of the audit. Tampa Electric attachers were invited to and

most attended a meeting to discuss the audit on August 10, 2007. The consensus from those attachers represented in the meeting was that the audit was fair, reasonable, cost effective and beneficial to all parties.

Mr. Harrelson expresses concern about the 8.5 percent failure rate which he says "...appears to be unreasonable."

This failure rate, based on 2006 inspection results only, represents the percentage of poles that failed the initial visual inspection or screening and not the percentage of poles that have failed to meet the company's loading standards. However, this is consistent with this Commission's concerns expressed in the pole inspection docket that pole attachments have been made without the knowledge of the electric utility and are a significant cause of overloading. Hence the Commission ordered the inspection process and subsequently approved Tampa Electric's pole inspection process. The 8.5 percent failure rate is indicative of the cavalier approach by attachers to pole attachments in the past. Cable companies have had the attitude that they can attach without notice and without doing appropriate loading analysis. The results of this approach has led to the

Commission's findings on February 27, 2006 in Order No. 06-0144 that pole attachments are causing overloads and its direction in that order to target joint use poles for inspections and audits.

Q. Mr. Harrelson at page 25, line 1 through page 27, line 4 questions whether PoleForeman takes into account the guying effect of lateral lines on the pole without special applications procedures. How do you respond?

A. PoleForeman takes into account all relevant criteria for assessing the true strength of a pole and its ability to withstand wind and loading. PoleForeman specifically considers the guying effect of lateral lines on the pole. Tampa Electric uses extra caution to be sure each joint use pole is individually and fairly evaluated. In fact, PoleForeman was implemented by Georgia Power Company in 2005, a utility company where Mr. Harrelson was employed for 27 years, to help address the pole loading issues observed with the increasing number of joint use pole lines on their system. An article written in 2005 by Mickey Gunter, a retired 38 year employee from Georgia Power Company with a vast amount of engineering and NESC knowledge, addresses the issues that Georgia Power Company faced and how PoleForeman helped solve them. In the

article, Mr. Gunter states, "The program features a solid model view that provides a 3D representation of the pole, which is beneficial for verifying attachments. With the PoleForeman software, we can run pole loading and guying calculations…." This article is attached in my Exhibit No. ____ (RBH-2), Document No. 1, pages 1 through 3.

Q. How specifically is the guying effect considered in PoleForeman?

A. This effect can be illustrated by reviewing the screen employed by PoleForeman. The screens which consider guying are shown in my Exhibit No. ____ (RBH-2), Document No. 2, pages 1 and 2.

Tampa Electric is using and/or has validated the use of PoleForeman, Ocalc and LD Field software applications. These pole loading programs are used by Field Engineering Technicians designing and maintaining overhead distribution lines. These programs provide an efficient and accurate method for assessing transverse, longitudinal and vertical loads on existing and proposed pole structures and properly sizing guy strands to meet the requirements of the NESC. The factors used to determine required pole strength are: pole length, class and setting

depth; construction type (cross arm, triangular, vertical etc); NESC loading district and construction grade; equipment selection (transformer, capacitors, reclosers, etc.); all conductors (size, type, span length and tension) and guying effects (strands size, type, length, angle anchor type and size).

Q. Mr. Harrelson on page 27, lines 1 - 5 asserts that you have made no commitment to evaluating the feasibility of adding a methodology to account for guying effects of other lines, cables and guys on poles. How do you respond?

A. This statement is surprising in view of the fact that Tampa Electric told Mr. Harrelson at the workshop on August 16, 2007 that guying is considered by PoleForeman and is part of Tampa Electric's loading analysis.

Q. Mr. Harrelson contends at page 27, line 6 through page 29, line 19 that Tampa Electric will use the inspection process to unfairly shift cost of storm hardening to attachers. How do you respond?

A. First of all, the Pole Inspection Program was ordered by the Commission in a separate docket and Tampa Electric's

process for doing the inspections has already been approved. Further, Mr. Harrelson's concerns are without merit.

His first point of contention is that loading analysis is only done on joint use poles. He claims this approach is discriminatory. Tampa Electric was specifically ordered to perform loading analysis on joint use poles because of the Commission's finding in Docket No. 060078-EI that:

> We believe that third parties have completed pole attachments to electric IOU wood poles that were done without full consideration of the NESC requirement. Thus, we find that wood pole strength inspections under such conditions require both remaining strengths as well as pole attachment loading assessments.

This finding was under the heading: "Pole Inspections for Strength Requirements Related to Pole Attachments." See Order No. 06-0144 issued February 27, 2006.

Tampa Electric cannot be faulted for following the Commission's order. Furthermore, it was reasonable for

the Commission to require a focus on the condition it found was a likely source of overloads. Such an approach is not discriminating but is a fair and reasonable target. FCTA is uncomfortable with this scrutiny but it is entirely warranted.

Q. Mr. Harrelson contends at page 27, line 15 through page 28, line 2 that TECO intends to assign responsibility for overloading a pole in a discriminatory and arbitrary manner. How do you respond?

A. Tampa Electric's approach is well founded, reasonable and consistent with Tampa Electric's experience.

Cost responsibility for overloading a pole will only be assigned in the situations where third parties have attached without permitting and prior approval. As described in the company's responses to FCTA's First Set of Interrogatories, the company utilizes all of the information in its possession to determine who has been permitted to attach to a given pole and when that attachment occurred. This information will be utilized to determine which attacher was last on the pole and is likely causing the overload. In the situations where the company does not have adequate records to determine the

order in which the third parties attached to the pole, the company would work with the third party attachers involved to review permits and make logical assumptions, if needed, based on the timing of the presence of each third party in that area and the likeliness of when the third party would have attached. This is the same approach Tampa Electric has historically taken, and had agreement from all third-party attachers, and it has work successfully in the past.

Q. Mr. Harrelson asserts at page 28, line 3 through page 29, line 11 that TECO's intention to assess responsibility for overloading on any party that cannot produce an approved application is unreasonable. How do you respond?

A. The company has stated that it will review all of the records it maintains to determine if a permit was granted for an attachment in question. Unfortunately, the company has experienced a large number of unreported attachments in the past and specifically, the company identified in a 2001 pole audit that in excess of 20 percent of its third-party attachments were on the system without prior knowledge or approval and without engineering analysis. Given this history, the company is requiring that the attaching party take responsibility of producing all attachment permits. I believe this is fair and reasonable

in light of the significant number of attachments that have been made to the company's our system without approval.

Attachment Standards and Procedures

Q. Mr. Harrelson at page 30, line 8 through page 31, line 11 contends that Tampa Electric includes certain terms and conditions governing third party attachments that are not related to storm hardening and should not be approved. How do you respond?

A. When developing its Attachment Standards and Procedures document, Tampa Electric attempted to create a comprehensive manual from which all third parties wanting to attach to the company's facilities would benefit. The intent was to address all items required to do joint use business with Tampa Electric. This included: the need to have an executed attachment agreement, how to receive a permit, the process of performing an engineering study to ensure that the pole can accommodate the attachments and completing any make-ready needed prior to attaching, the inspection process, how code violations will be addressed, the process used by the attacher and the company to communicate and document timing of projects, final permit

issuance, the company's Pole Inspection Program as it pertains to third party attachers, and a brief description of the company's pole audit program. While these items do not cover every specific item and detail, they should help clarify these aspects of the company's attachment standards and procedures. Most of the items listed do relate to storm hardening in some fashion. In order to ensure that the electric system meets all applicable standards such that outages and restoration times are minimized following a major storm event, the company believes that nothing shall be attached to a pole that is not engineered and constructed to accommodate it. This cannot be accomplished without the items mentioned in the company's attachment standards and procedures.

Q. Mr. Harrelson contends that pole attachment procedures 8.1, 8.2, 8.4.1, 8.5, 8.7 and 8.8 do not relate to storm hardening. How do you respond?

A. First, Mr. Harrelson complains that 8.1, requiring an attacher to have an attachment agreement, is not related to storm hardening. This is incorrect. The first and most fundamental building block of Tampa Electric's Plan is to be aware of all entities which intend to attach to Tampa Electric's poles before an attachment is made.

FCTA's objection here is another indication of the cavalier approach attachers have taken in the past which has led to the abuses the Commission has ordered Tampa Electric to address. Tampa Electric's Hardening Plan contemplates a continuing dialog with attachers. This cannot be accomplished if entities which are attaching to Tampa Electric's poles do not even have a pole attachment agreement.

Section 8.2 addresses Permit Application Procedure. It is also fundamental that prior to attaching any new attachment or overlashing a permit application must be submitted. This is entirely consistent with this Commission's policy that nothing should be attached to a pole that is not engineered to be there in advance. This requirement is also fundamentally related to this Commission's concern with respect to the safety and reliability of electric infrastructure. Pole attachments have been found to be made without notice and have been identified as a significant source of overloading. Section 8.2 is reasonable and should be approved.

Section 8.2.2 was inadvertently omitted from the list of attachment standards in my direct testimony which should be approved. Section 8.2.2 requires an engineering study

of proposed pole attachments to ensure compliance with the NESC and Tampa Electric's construction standards. This provision is entirely reasonable and should be approved.

Section 8.4.1 addresses the procedure of notification when Tampa Electric finds violations to NESC or construction standards. This provision is entirely reasonable and addresses how communication will be made.

Mr. Harrelson also objects to the provision that provides for Tampa Electric's completion of corrective action at the attacher's expense if they fail to correct the code violation. This is obviously related to the safety and reliability of the electric system and is entirely fair.

Section 8.5 requires Tampa Electric and attachers to use the National Joint Utility Notification System ("NJUNS") to address code violations Tampa Electric identifies. This notification tool is paid for by Tampa Electric and does not cost attachers anything to use. This provision is entirely reasonable and should be approved.

Section 8.7 references Tampa Electric's Pole Inspection Program. Mr. Harrelson's objection to the provision in Section 8.7 provides that stress calculations will be

conducted on joint use pole or part of the ground inspection program to ensure that each pole is not overloaded or approaching overloading is entirely reasonable. Mr. Harrelson's complaint here is a rehash of concerns expressed earlier in his testimony regarding the details of the stress calculation, the consideration of guying and the focus of the inspection on joint use poles. Each of these points is addressed previously.

Q. Mr. Harrelson asserts on page 32, lines 20-21 that the method of calculating the loading on a pole is not FPSC jurisdictional. How do you respond?

A. Tampa Electric will address this point in its post-hearing brief but it is somewhat bizarre that FCTA would contend that a loading calculation is not related to the safety and reliability of the electric system which is a principal area of concern of the Commission and the fundamental reason for the Commission's multi-pronged approach to making these systems more resilient to the effects of extreme weather. Further, Mr. Harrelson uses a great deal of space in his testimony filed with this Commission discussing the elements which should be considered in a loading analysis.

Q. Mr. Harrelson at page 33, line 1 through page 39, line 16

asserts that Section 8.3 is not reasonably practical because of its reference to overlashing. How do you respond?

A. Overlashing is a fundamental practice which over time has placed a tremendous burden on Tampa Electric's poles. Mr. Harrelson attempts to minimize the effects of overlashing are misleading. The mindset expressed in Mr. Harrelson's testimony exposes a fundamental cause of the abuses found on our system leading to overloads. FCTA wants to continue the practice of the addition of unnoticed burdens on electric facilities. The excuses offered are: (1) overlashing does not use more pole space; (2) attachments do not significantly increase the load; (3) overlashing causes a small incremental load; and (4) electric company attachments account for most of the wind load.

All of these excuses miss the fundamental point. Regardless of whether the overlash does not use more pole space, this practice does add additional load on the pole.

The level of this burden is readily assessed in the pole loading procedures. These procedures cannot be completed if Tampa Electric is not notified in advance of the overlashing. Surely these companies know some time in

advance that an overlashing is planned and it is not unreasonable to provide prior notice.

Mr. Harrelson's assertion that the overlash will not significantly increase the load is simply not true. Over time, single attachments have been overlashed six, seven or more times until the attachment which started out as a single wire is now the size of a log providing significant weight and wind resistance.

Tampa Electric has experienced situations where an overloaded pole attachment exerted such weight and pressure that the pole was severed at the point of attachment. This result, along with other examples of pole overloading due to overlashing are found in the pictures contained in my Exhibit No. ____ (RBH-2), Document No. 3, pages 1 through 11.

As previously discussed, the lack of overlash notification by third-party attachers has historically menaced Tampa Electric's system. However, when third-party notifications and requests have occurred, the planned overlashing would add more than just a small incremental load to the company's poles. Document No. 4 of my Exhibit ____ (RBH-2) provides the detail of the number of poles

third-party attachers requested to overlash during the 2001-2005 period. The data clearly demonstrates that cable sizes as large as 0.98 inches and bundle sizes up to six cables were requested for overlashing.

Q. Mr. Harrelson proposes at page 34, line 12 through page 36, line 10 that cable companies be exempt from notification unless the cable company determines within 30-days of the overlash that the loading brings the pole out of compliance. How do you respond?

A. This proposal is inconsistent with the Commission's policy, would lead to abuses and should be rejected.

The fundamental point is that burdens placed on the pole must be noticed in advance to avoid overloading. Secondly, an attacher would have no incentive to actually do the loading analysis or to report non-compliance. Tampa Electric has no confidence that a loading analysis conducted by the attacher would accurately assess the load. Finally, Tampa Electric would never know whether the analysis had been made.

Q. Mr. Harrelson states at page 34, lines 19 - 21, that post attachment notice has been the practice for years. How do

you respond?

A. Attachers in the past have either failed to provide notice at all or have provided after the fact notice. This has been a source of frustration and has led to abuse. The Commission's multi-pronged approach to making electric systems more storm resilient seeks to remedy these past abuses and to place a new emphasis on safeguards which will protect the electric system from overloads. It is simply no longer acceptable for attachers to place unnoticed burdens on electric systems.

Q. Mr. Harrelson asserts on page 36, line 11 - 25 asserts that pole attachments can have a beneficial effect on pole loading. How do you respond?

A. Any such beneficial effects are taken into account in the PoleForeman analysis. Make no mistake, in most instances pole attachments increase the burden on the pole.

Q. What is your response to Mr. Harrelson's proposal that a threshold be established which exempts overlashing from analysis?

A. I fundamentally disagree with such an approach. Tampa

Electric has experienced overlashes of six, seven or more times. While each individual overlash may not overload, these overlashes together may cause a significant overload that would not be detected. The only sound approach is to follow this Commission's policy that nothing should be attached to the pole that is not engineered in advance to be there.

Summary

Q. Please summarize your Rebuttal Testimony.

A. While it appears that Mr. Walker and Mr. Harrelson agree with the general approach taken by Tampa Electric in its Plan, there are several areas they have taken issue with which I do not agree.

First, many of Mr. Walker's and Mr. Harrelson's issues relate to Tampa Electric's Wood Pole Inspection Program and Pole Attachment Audit which have already been approved by the Commission, are well underway and are beyond the scope of this proceeding.

Second, Mr. Walker and Mr. Harrelson contend that replacing sound construction Grade C poles with

construction Grade B poles is not prudent. I believe the primary reason Tampa Electric's system performed so well during the recent hurricanes is due to the construction standards instituted by the company in the early 1970s. Tampa Electric recognizes that any poles that are found not meeting its current standards (construction Grade B) are a weak link on the system and create a greater risk of failure during an extreme wind event. Therefore, when non-compliant poles are identified, the poles should be upgraded to meet the company's current construction standards.

Third, Mr. Harrelson states that Tampa Electric's plan does not contain enough detail and that FCTA's input was not solicited. This is not true. Tampa Electric's Plan included details for all anticipated hardening projects for the 2007-2009 period. Tampa Electric participated in multiple meetings and conference calls with FCTA and its membership, offered to ride the various routes with FCTA representatives, and provided detailed pole counts for its specific hardening projects. Additionally, details such as engineering designs will be made available to FCTA through the stipulated agreement of the Process to Engage Third-Party Attachers (referred to as the "process within a process" at the various Commission workshops).

Fourth, the claim by Mr. Harrelson that Tampa Electric's Plan will cause cost increases to the cable operators is accurate. There is a cost associated with the company's strategic plans to harden its system. Consequently, for third-party attachers to the company's facilities, a fair and equitable increase of costs will occur; however, a commensurate increase in system safety and reliability will result for not only Tampa Electric but its third-party attachers as well.

Finally, I take exception to Mr. Harrelson's assertion that the approach Tampa Electric will employ to assign cost responsibility is unfair and a way to place blame and shift costs. Tampa Electric will assess costs to any third-party attacher that: 1) wants to attach to a pole that does not have the capacity to accommodate the attachment, and 2) has attached to one of the company's poles without notice and approval and is causing an overload. This is a reasonable and fair approach for all third-party attachers.

In conclusion, Tampa Electric's approach of continuing to build to construction Grade B, upgrading weak links in its system when identified, undertaking specific pilot

projects to be constructed to NESC extreme wind and upgrading other key components of it system provides a reasonable, measured, multi-pronged approach to storm hardening the company's transmission and distribution system. This approach will provide Tampa Electric and all third-party attachers to its facilities a more reliable system better able to withstand the potential ravages of extreme weather events in Florida. With Tampa Electric's storm hardening activities and associated benefits to all entities attached to the company's facilities, additional costs will occur; however, Tampa Electric will fairly and equitably appropriate these incremental costs, both to itself and all affected third-party attachers.

Q. Does this conclude your Rebuttal Testimony?

A. Yes.

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EXHIBIT NO. _____ (RBH-2)

REBUTTAL EXHIBIT OF

REGAN B. HAINES

DOCKET NO. 070297-EI
EXHIBIT NO. _____ (RBH-2)

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TRANSMISSION & DISTRIBUTION WORLD

Line Loading and Clearance Calculations Improved

Mar 1, 2005 12:00 PM
By Mickey Gunter, Georgia Power Co. (Retired)

Georgia Power Co., a subsidiary of Southern Compnay, has seen its workforce change as a result of downsizing and retirements; therefore, the background experience of the distribution employees varies widely. They may have an engineering, marketing, accounting, customer service or line construction background. For a company that installs thousands of distribution poles each year, and strings miles and miles of overhead power lines, the diverse makeup of Georgia Power's (Atlanta, Georgia, U.S.) workforce prompted the utility to take a closer look at its engineering training and tools.

As an electric utility, Georgia Power has a responsibility to meet basic National Electrical Safety Code (NESC) requirements when installing and maintaining its power distribution facilities. In the past, the utility relied on rules of thumb, experience or hand calculations to determine pole classes, guy wire tensions and conductor clearances. The only pole loading guide we had was an old specification sheet that showed the pole class required for different sizes of banked overhead transformers, regardless of other facilities on the pole. Furthermore, there was no engineering documentation for this specification sheet.

Because making hand calculations was a time-consuming process and required an extensive engineering background, along with knowledge of the NESC, most engineering field personnel did not perform these calculations. As a result, we were generally using past experience or rules of thumb to determine pole classes and guying requirements. Since most distribution pole line specifications have always been fairly standard, this method of applying rules of thumb and past experience was probably acceptable because if it worked then, it will still work now.

Guying is similar to pole loading in that the manual calculations are cumbersome, time consuming and sometimes difficult for field engineering personnel, especially those with little engineering or math background. As with pole loading, rules of thumb and past experience for guying were used most of the time.

But times have changed. The Telecommunications Act and Georgia's Territorial Act caused a great increase in the number of joint-use pole lines, not only with multiple communications attachments but also with multiple joint attachments with supply companies. Insurance companies are starting to question damage claims or not pay them because of various incidents, including storm-caused damage. Utilities had allowed communications companies to install cables on their poles without determining if the poles met the NESC strength and loading requirements. It is not uncommon around Atlanta to have a distribution pole with two or three supply companies along with several telephone and CATV companies attached. Because it is getting more difficult to obtain guying easements, the use of self-supporting poles has increased dramatically. Rules of thumb and past experience are simply not good enough anymore.

Like pole loading and guying, an understanding of conductor dynamics and the NESC is required to accurately determine pole heights. Georgia Power's conductor sag-tension tables show how the conductors respond to varying temperatures and how mechanical loading conditions are used to determine the maximum final sag of conductors. To manually determine conductor final sags, engineers would locate the conductor in the sag tables, find the appropriate ruling span and length, and then find the worst-case final sag based on NESC requirements. Using this final sag data, along with conductor/cable and equipment attachment points per Georgia Power's specifications and NESC clearance requirements, would enable us to determine pole heights. We want to make sure our people have adequate training and the tools they need to get their jobs done right. To help achieve this goal, we have deployed the PoleForeman and SagLine engineering software products developed by PowerLine Technology Inc. (www.powerlinetech.com).

PoleForeman allows Georgia Power's field workers to quickly and easily analyze a structure with easy editing features to make changes in the design criteria that will not only check NESC requirements, but will aid in determining the most economical installation.

Our goal when implementing the PoleForeman and SagLine software products was to provide an efficient and accurate method of performing engineering-related calculations. These tools allow us to achieve consistency among our engineering departments across the state. For example, when the extreme wind loading (NESC Rule 250C) was revised in the 2002 NESC, we were able to implement that change immediately using the PoleForeman software. Also, the recent change in ANSI 05.1 that requires a reduction of a wood pole's fiber stress with increased height will automatically be taken into account using the software. The capability to seamlessly implement changes from the NESC or our own standards is a great benefit to the company.

We've found the graphical user interface to be straightforward to use. Our field personnel draw the power line layout just as they would in a work order. They specify inputs, including wire size, span length and joint-use attachments, and then run the analysis. The results let the designer know if the pole meets basic NESC strength requirements. The program features a solid model view that provides a 3D

representation of the pole, which is beneficial for verifying attachments. With the PoleForeman software, we can run pole loading and guying calculations in 10 minutes or less.

SagLine helps determine conductor ground clearances and vertical clearances between supply and communications facilities to ensure NESC compliance. Like PoleForeman, the user interface is simple. We specify inputs, including wire size, pole height and span lengths, and the program plots the sag profile for the span. The program has a terrain-modeling tool that allows the user to model the ground line topology under the span. The measuring stick calculates the conductor clearance at any point within the span. We no longer have to search through sag tables or make manual sag plots as the software provides this output.

Georgia Power deployed the Pole-Foreman and SagLine software programs as part of its SOCKET initiative. SOCKET is a conglomeration of engineering software programs used by Southern Company's distribution field personnel. The applications within SOCKET include transformer loading, voltage drop, flicker, cable pull, pole loading and clearances. We believe this software platform has many advantages over past methods of performing distribution engineering calculations. Programs like PoleForeman and SagLine help take subjectivity, guess work, and generalized assumptions out of the equation. These programs can perform calculations with tremendous speed and accuracy, which allows us to look at "what-if" scenarios and optimize our designs.

Another benefit is the training aspect. We can take complicated subject matter like pole loading and train someone without a technical background to perform that task. This makes us more efficient and productive as a company.

Mickey Gunter has extensive experience in distribution engineering design, standards and training. He recently retired after a 38-year career with Georgia Power Co., but is still actively involved in teaching National Electrical Safety Code Schools for Georgia Power Co. and Southern Co. engineering and line personnel. Gunter serves on ANSI C-2 NESC Subcommittees (SC4, SC7 and Interpretations), and the NESC committees of the Southeastern Electric Exchange and the Edison Electric Institute. mgtech@bellsouth.net

Three Examples of the PoleForeman Software in Use

Example 1: *Choose a 50-ft pole, Grade C (noncrossing), Medium Loading District, 3-795AAC primary conductors with #4/0 ACSR neutral, tangent construction, vertical spacing, 250-ft ruling span, 3-100 kVA transformers and three communications attachments.*

According to our spec page, a Class 3 wood pole will work. But is this OK? With the PoleForeman software, we can now use the above data to determine if this 50-ft, 3 pole is indeed adequate for both height and strength for this type installation. After analyzing the structure with PoleForeman and using the Sag Profile option, we find that a minimum 50-ft pole is required for the height. However, the vertical loading was 111%, which exceeded the NESC strength requirements. By simply changing the 50-ft Class 3 to a 50-ft Class 2, we now find that the vertical loading is 89%. So, a 50-ft Class 2 wood pole will be adequate for this installation.

Example 2: *Choose a 50-ft pole, Grade C (noncrossing), Medium Loading District, 3-336 ACSR primary conductors with #4/0 ACSR neutral, horizontal dead-end construction, 250-ft ruling span, 3-100 kVA transformers and 2-11.5M anchor guys (25- and 22-ft leads, respectively).*

According to our spec sheet, a Class 3 pole will work. After analyzing the structure with PoleForeman and using the Sag Profile option, we found that a 45-ft pole will work for the height. However, a 50-ft Class 3 pole has a vertical loading of 105% and the lower anchor guy with the 22-ft lead has a loading of 104%. What are our options? Install a 50-ft Class 2 pole that meets both NESC clearance and strength requirements and increase the lead lengths of the anchor guys to 25-ft and 28-ft, respectively. Or, install a 45-ft Class 3 pole with 22-ft and 25-ft lead lengths, which also meets basic NESC clearance and strength requirements. Of course, the 45-ft Class 3 is the most economical pole to choose and still provides basic NESC safety requirements.

Example 3: *Choose a 50-ft pole, Grade C (Non-crossing), Medium Loading District, 3-2/0 ACSR primary conductors with #2/0 ACSR neutral, horizontal dead-end construction, 250-ft ruling span, 3-100 kVA transformers, self-supporting structure with no guys.*

It is difficult to use rules of thumb and past experience to determine the pole class of self-supporting poles because we have not had that many in the past. Also hand calculations can be labor intensive, time consuming and difficult. As a result, we would generally give it our best guess, maybe even using a steel or concrete pole. Using PoleForeman to analyze this type installation, we find that a 45-ft Class H-6 wood pole is adequate for the height requirement, but has horizontal loading of 101%. A 50-ft (15-m) Class H-6 wood pole has a horizontal loading of 103%. Since a Class H-6 wood pole is the largest standard pole purchased by Georgia Power Co., what do we do now? We can now use the Moment, Shear, Axial and Deflection data created by PoleForeman to give to a pole manufacturer to customize a class pole that will work, which is generally what we do.

Find this article at:
http://www.tdworld.com/distribution_management_systems/power_line_loading_clearance/index.html

☐ Check the box to include the list of links referenced in the article.

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POLEFOREMAN GUYING SCREENS
EXHIBIT NO. _____ (RBH-2)
DOCUMENT NO. 2
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PoleForeman does not require any "special application procedure" for guying effects. PoleForeman guying effects are intergraded into the program screens as demonstrated below. Tampa Electric has further automated the process by building the company's construction standards into PoleForeman templates which includes many guying effects for such structures are deadends, double dead-ends, angled tangent structures and corners (dead-end, and running) etc.

PoleForeman's Guying Screens

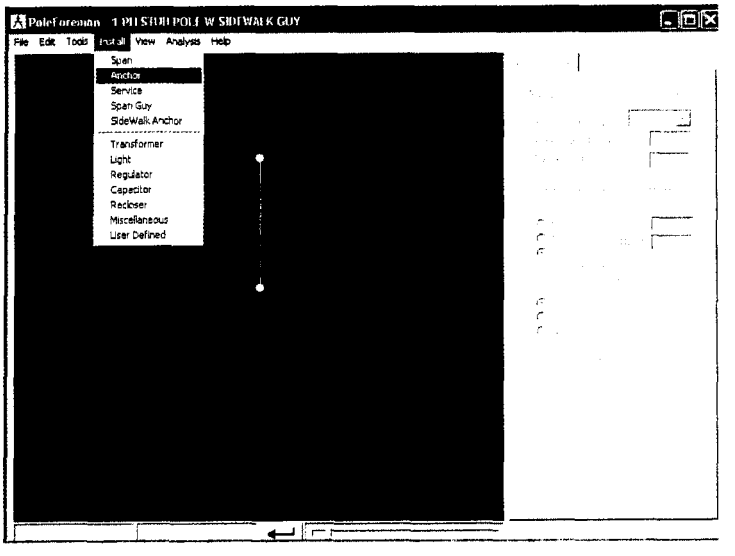

Figure 1: Screen shows guying menu include choices for Down Guy, Span Guy and Sidewalk Guy.

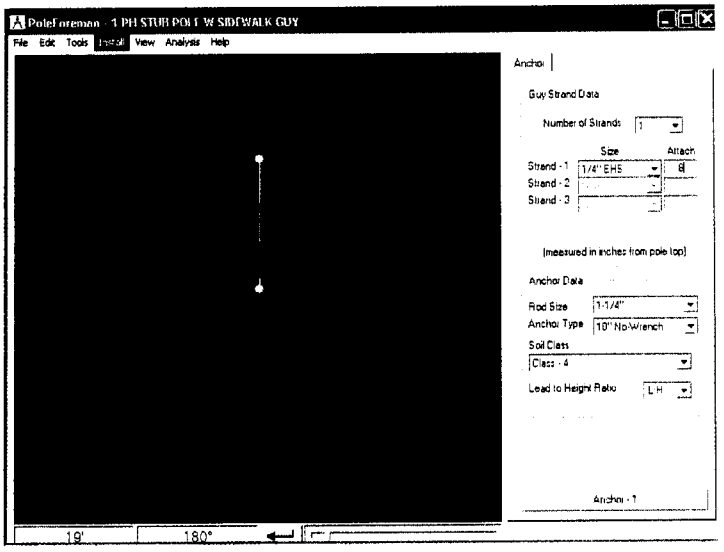

Figure 2: Screen options include number of strands (size and type), anchors (type and rod size), soil class and lead to height ratio.

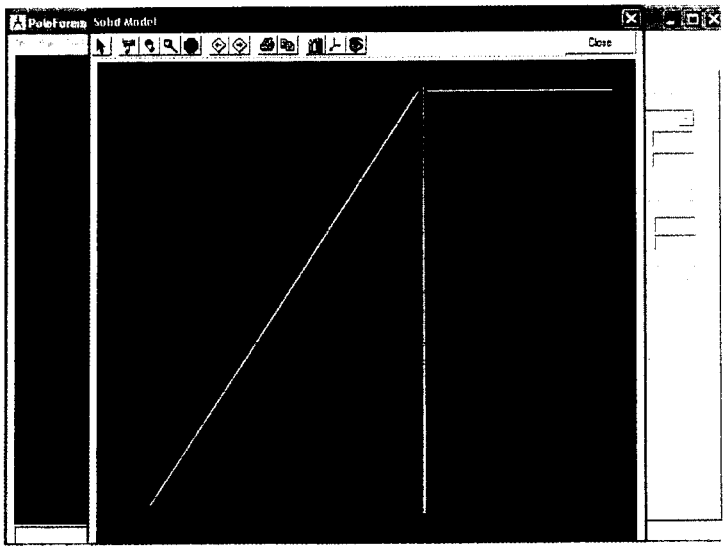

Figure 3: Screen also includes solid model view of a down guy.

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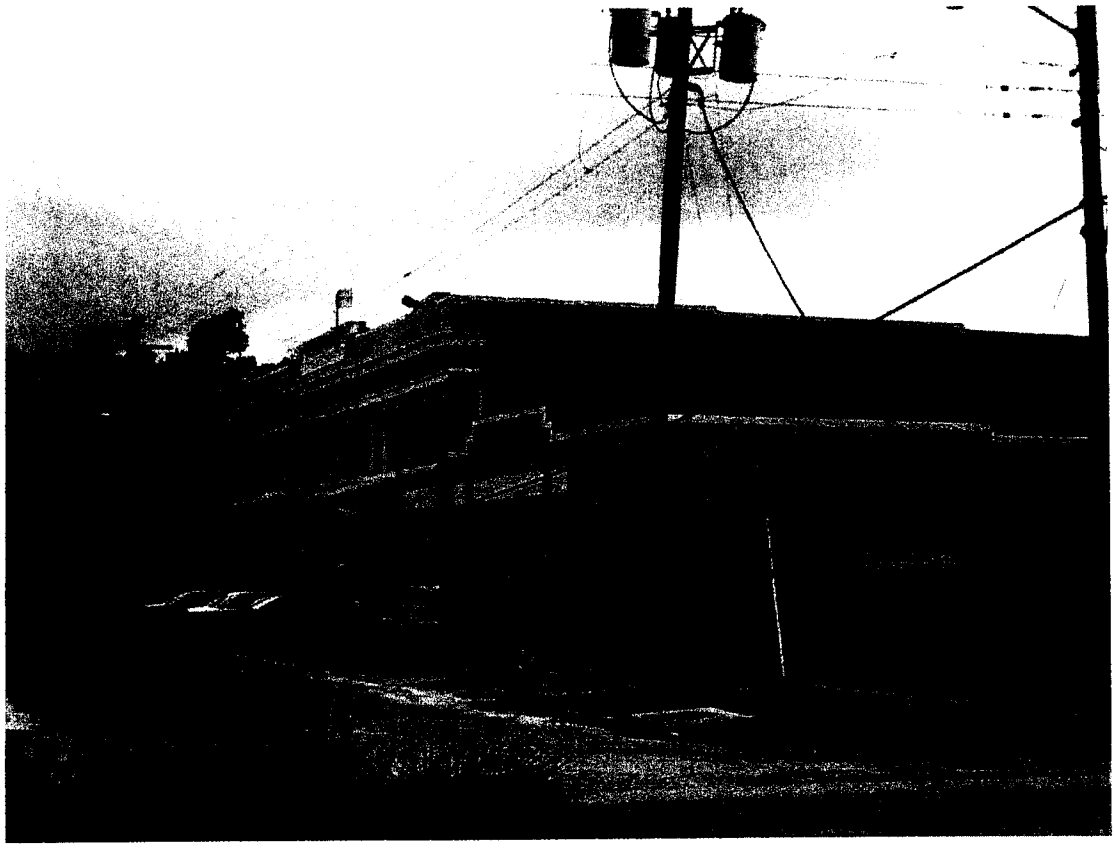

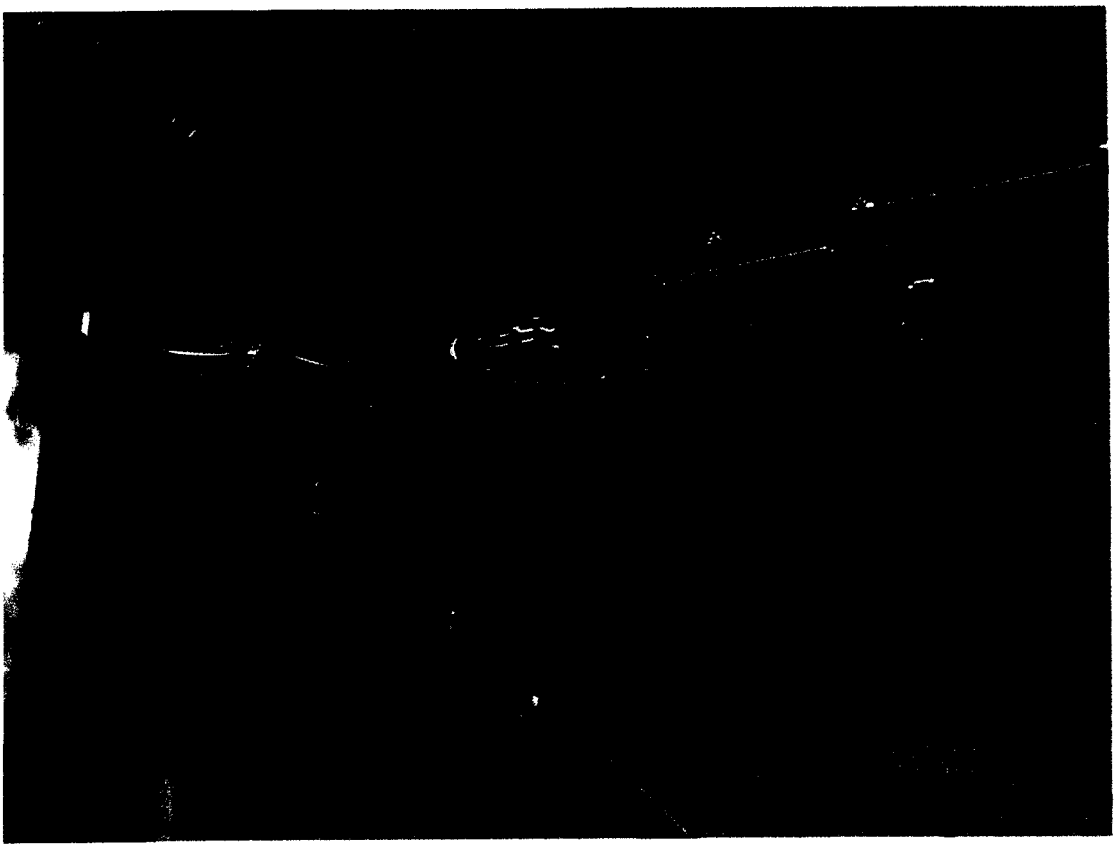

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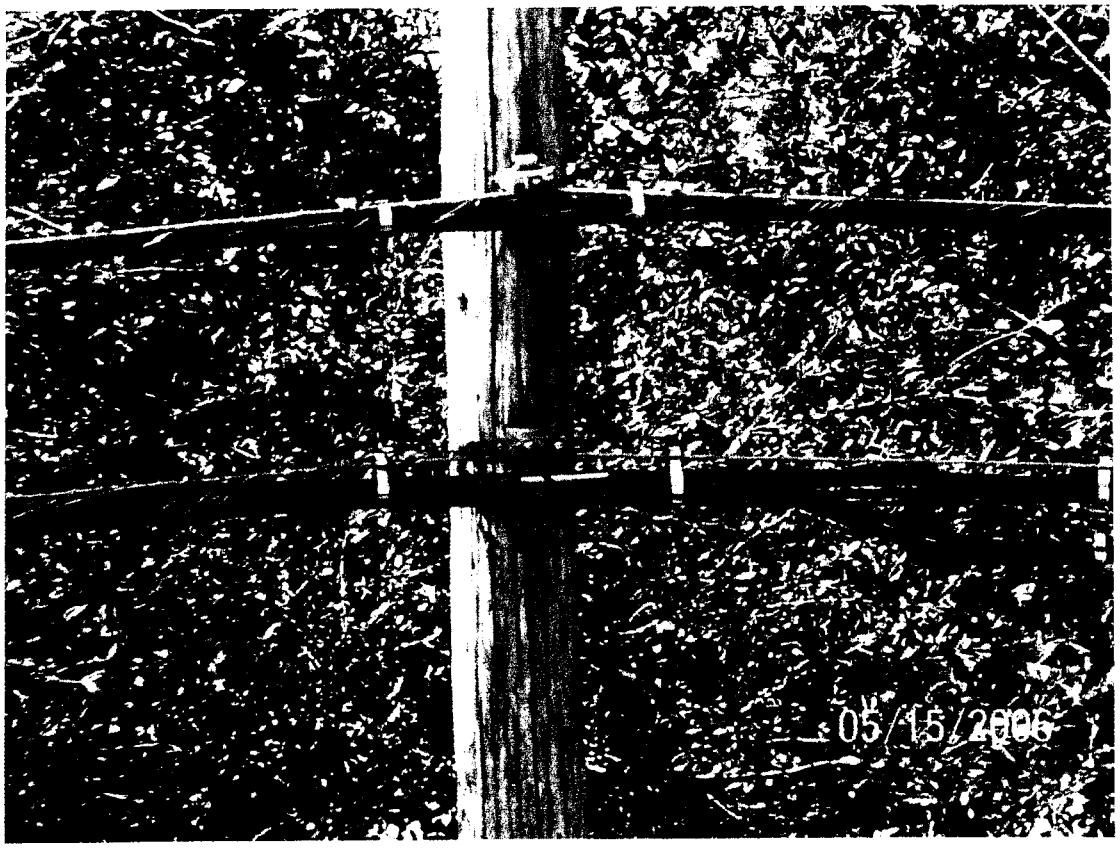

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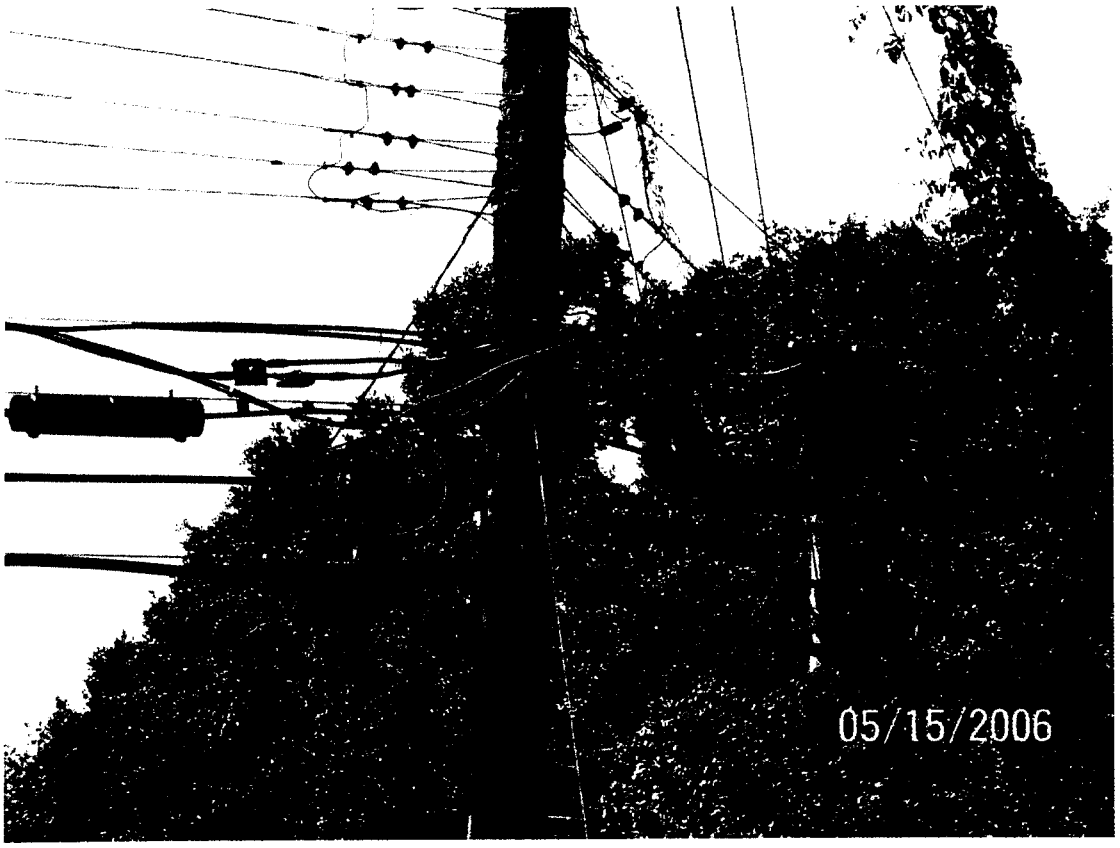

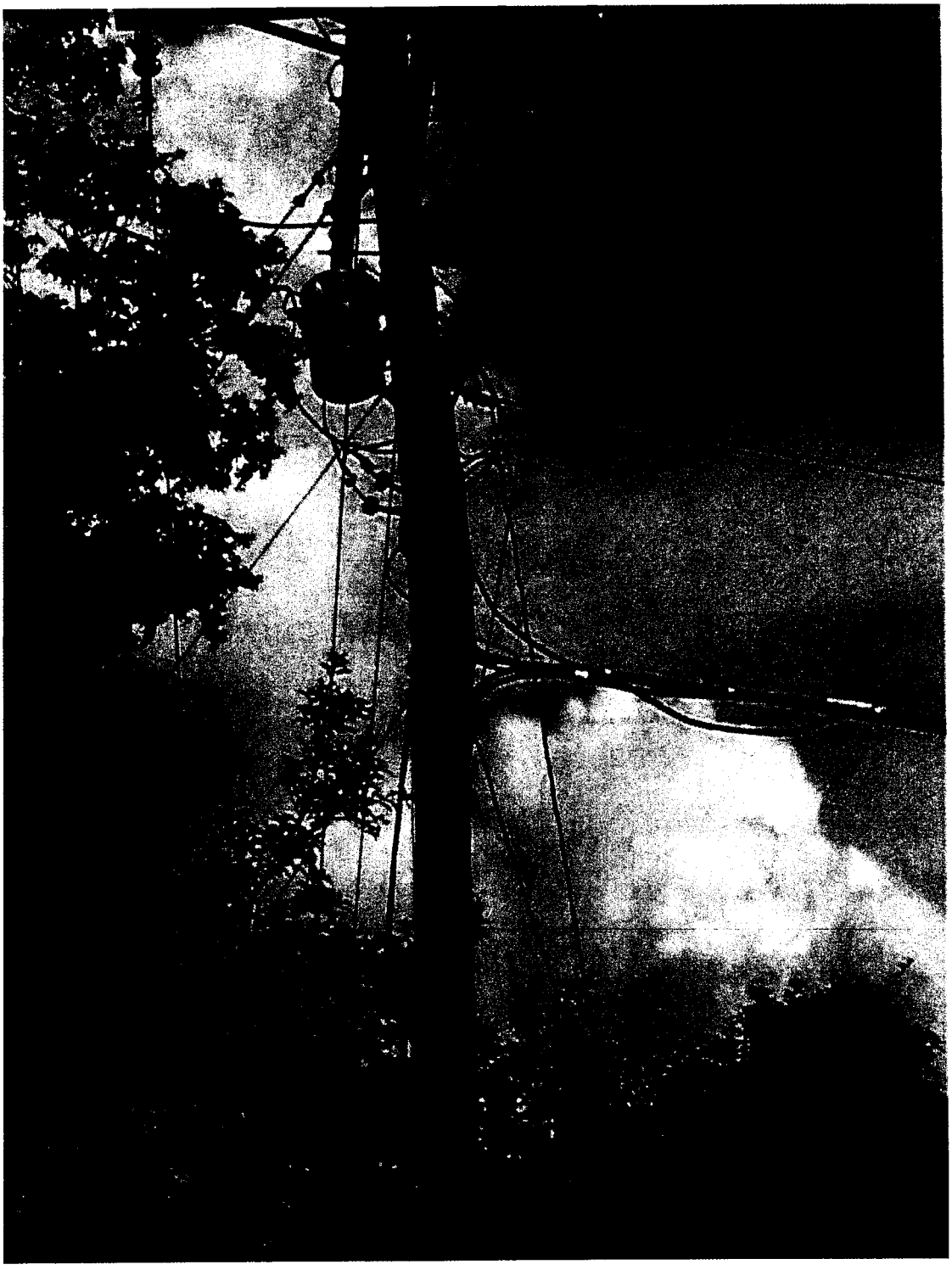

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DOCKET NO. 070297-EI
OVERLASHING PERMITS
EXHIBIT NO. _____ (RBH-2)
DOCUMENT NO. 4
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NUMBER OF POLES REQUESTED FOR OVERLASHING
2001 - 2005

OVERLASH ONLY

CABLE SIZE (inches)		0.25	0.5	0.54	0.59	0.625	0.7	0.75	0.875	0.98
COAX	2001					13		8	12	
	2002					28		27		
	2003					17		17	13	
	2004					10		12		
	2005					15		4		
COPPER	2001									
	2002									
	2003									
	2004									
	2005									
FIBER	2001	26			167	9				
	2002	36			180	2		47		116
	2003			11	161	97				
	2004		10		64					
	2005		66		30		306			
STRAND	2001									
	2002									
	2003									
	2004									
	2005									

OVERLASH ONLY

Max No. of Cables in Bundle		0.25	0.5	0.54	0.59	0.625	0.7	0.75	0.875	0.98
1	2001									
	2002					4				
	2003					3			11	
	2004									
	2005					4				
2	2001					15		3		
	2002					2		5		
	2003				7				2	
	2004				52	7				
	2005		3							
3	2001	26						5		
	2002	36				15		10		
	2003			11	20	9		8		
	2004		10		12	3		12		
	2005		23			9		4		
4	2001				41				12	
	2002				57	4				116
	2003				87			9		
	2004									
	2005		15			2				
5	2001				126					
	2002				123	5				
	2003									
	2004									
	2005		14		30					
6	2001									
	2002							12		
	2003				47					
	2004									
	2005		11				306			